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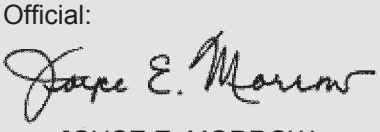

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The Professional Bulletin of Army Engineers

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Front Cover: ENFORCE 2009
Back Cover: Year of the NCO

Designed by Jennifer Morgan

DEPARTMENTS

FEATURES

Clear The Way

By Colonel Robert A. Tipton
Commandant, United States Army Engineer School

As we once again transition leadership at the Engineer School and come together for the annual ENFORCE conference, I thought it appropriate to provide a regimental perspective on the current operational and strategic environment, as we are at a time that offers great challenge—but also great opportunity.

We all know that our Army and Regiment have changed dramatically over the past decade, but from an enduring perspective, this past year may be the most significant. With the February 2008 publishing of FM 3.0, *Operations*, our Army's capstone doctrine, stability operations are now equally as important as offensive and defensive operations. For years, tasks associated with "nation building" were to be avoided because we were designed and equipped for high-intensity operations and would only do those other tasks when we had to. From our experiences over the past decade, we know that stability operations require new capabilities and new tactical and technical competencies for engineer Soldiers. Prior to this new doctrine, most engineer Soldiers and leaders were not required to have a high level of technical skills. The Engineer Regiment has been at the tip of the spear in terms of transformation and in prosecuting full spectrum operations in two separate theaters, and we should be proud of how well we have done on both fronts under an operational design that never expected us to conduct the myriad of tasks associated with stability operations. However, experience over the past 5 years illustrates that stability operations need military engineer capabilities and skills that were not previously required, and it is important that we articulate to Army leadership how important it is to support our Regiment's efforts to continue to adapt to this new reality. I believe we have done a relatively good job of identifying how we must change and are working many initiatives to develop the Engineer Regiment we need now and for the foreseeable future. Central to this is the *Building Great Engineers* campaign, which we will again focus on during this year's ENFORCE. However, to be successful in these endeavors, we must collectively educate the Army at large on these new realities, and to do this, we must educate our own Regiment. To this end, I ask each of you to work the following three strategic messages into your conversations, writings, and briefings whenever possible:

Strategic Message #1: FM 3-0 places stability and civil support operations on equal par with offensive and defensive operations. These operations require new and significantly higher engineer technical capabilities than under previous Army doctrine, and the Army must adapt its engineer force within the context of this new doctrine.

Strategic Message #2: The current Army and engineer leader development and personnel management system is not optimized to create engineer leaders with the technical and tactical engineering skills needed for full spectrum operations. The Army needs to recognize this and support the Engineer Regiment's actions to build great engineers in order to provide the higher degree of technical capabilities our force needs, even at a time when the United States as a nation is producing fewer engineers.

We are focused on the personnel domain, which has historically compensated for shortcomings in other domains. We will never have the exact doctrine, organization, or materiel that we need, so it is up to our Soldiers and leaders to adapt and develop solutions on the battlefield that will achieve victory. We recognize that our challenges do not reside entirely in the personnel domain. The modular force has not been fully fielded, and we must have the tactical patience to grow the complete force before we make radical judgments on its effectiveness. We must remind ourselves that the modular engineer force provides much more balanced engineer capabilities for the force at large (combat, general, geospatial), and there is universal recognition that the new modular engineer battalion headquarters is much more capable than were the legacy engineer battalions. The primary shortfall that has become clear is engineer command and control (C2)—specifically within the brigade combat team (BCT). To leverage the engineer force pool, the BCT needs a more robust engineer C2 solution. To this end, I offer the final strategic message for your use as you engage our Army leaders:

Strategic Message #3: The Army's modular BCTs will need augmentation from the engineer force pool for virtually every mission assigned, because there is not enough engineer capability within the Army to provide each BCT with the organic engineer support it will need for full spectrum operations. These high-demand engineer capabilities must be carefully managed and seamlessly moved within and between BCTs throughout any campaign. In many cases, the engineer augmentation will be large enough to allocate up to an engineer battalion to the BCT to provide C2 of these units. Short of having the organic engineer capability needed, BCTs must be trained on how to leverage and integrate engineer capabilities from the force pool to meet this gap and must have a capable and robust organic engineer staff to enable efficient engineer integration.

It has been a great privilege to serve as your Commandant during the past 6 months. The Army has made an outstanding choice in the selection of our new Commandant, COL Bryan Watson, who comes to us with the right experience and is the perfect leader to take our Regiment forward. I will continue to serve the Regiment and the new Commandant as the Assistant Commandant and look forward to seeing you at ENFORCE. Remember that we are in a period of tremendous opportunity for the Regiment! Essayons!

Clear The Way

By Colonel Bryan G. Watson
Commandant, United States Army Engineer School

Stepping into the job as the Commandant of the Engineer School and Regiment is an incredible honor…daunting when I look at the character, vision, toughness, and accomplishments of the previous Commandants, from Colonel Jonathan Williams in 1802 to Colonel Bob Tipton today—all magnificent leaders. So, you wonder, how did that happen to Watson? Well, I'm very clear about how I got to these crossroads. It was the Soldiers, noncommissioned officers (NCOs), and officers that I've had the incredible privilege of serving alongside that got me here. THEIR dedication, THEIR sense of mission, THEIR personal sacrifice, and THEIR willingness to serve…made the difference. As I step into the position as the next Commandant, know that it was your hard work—your coaching—that prepared me for this job. I'm eternally grateful and look forward to living up to your expectations with the same sense of service. My wife Kris and I are elated about returning to our Home of Engineers and serving this tremendous regimental family to our utmost…a family we have come to love as our own.

Recently, during a meeting with senior engineer leaders from across the Regiment, our Chief of Engineers, Lieutenant General Van Antwerp, made the comment that these are historic times for our world, our Nation, our Army…and our Regiment. I had to ponder that for a moment. When I think of the challenges we faced in these past years of conflict and the accomplishments of engineers in the fight, they are beyond historic. The pace of operations at the unit level as we reorganize, field new capabilities, restation, prepare to deploy, conduct full spectrum operations in multiple theaters, and reset to redeploy is…well…unprecedented. The responsibilities borne by young engineer leaders in our small units are without parallel in my career…beyond our imagination only 10 years ago. Yet, they meet the challenge with splendor. Our adaptation of doctrine and tactics, techniques, and procedures (TTP) and the rapid fielding of new equipment to meet our dynamic needs in combat is extraordinary by every measure. Finally, the steely resolve of our Soldiers to see "the Long War" through to victory…to repeatedly deploy-redeploy-deploy…to get back out on point to clear and build the way! Frankly, it leaves me in absolute awe of today's engineers.

Yes, this is a historic time for our Regiment, replete with *historic challenges* overcome by *historic acts* by *historic-caliber* engineer Soldiers and Leaders in *historic service* to their nation. But don't let your focus on our recent challenges and accomplishments obscure what should be paramount. It is the *historic opportunity* we have to shape our Regiment for the generations of engineers still to join our ranks that makes these critical times. Our responsibility is to harness today's historic experience and use it to forge our future. We must make today's history matter so we can continue to answer the call of our Army and our Nation with the engineer service it has come to expect.

The question at hand is, *Where should we focus our collective efforts into prudent actions that will guarantee our Engineer Regiment's legacy of service to the Army and Nation into the future?* In my view, there are seven key strategic tasks that must guide us as we navigate the uncertain waters that lie ahead—in priority:

- **Breed the Army's best leaders** by instilling passion for the traditions of engineer service among all ranks and inspiring them to be part of something bigger than self...without passion, this is just a job.
- **Be clear in our purpose:** We exist to provide the full spectrum of engineer capabilities needed to **assure the movement, maneuver, protection, and freedom of action of the force** from theater to tactical-level operations. It drives everything we do; it must guide our priorities.
- **Build Great Engineers through lifelong development opportunities** for officers and noncommissioned officers to ensure that our formations have the technical skills, operational savvy, and physical/mental stamina to continue our heritage of expert service to the Nation in battle or peace.
- **Constantly improve the Regiment's stance at the line of scrimmage** so we can rapidly respond to the commander's audible with the full spectrum of engineer capabilities...and be ready for tomorrow's battle.
- **Extend our view of the engineer team** beyond our regimental formations in all components, to include our sister Services and industry partners; learn to leverage and complement their capabilities.
- **Take immense pride in our Regiment,** never forgetting our purpose to support the force first…**serving as engineers with the heart of a sapper!**

In my estimate, these strategic key tasks are imperatives for the future. Some we do extremely well now, while others represent recent initiatives already underway. We must sustain those efforts! But the list also describes new territory that I believe is vitally important to ensure that we provide commanders with the engineer force they require in future conflicts. They must guide our way ahead and the tough decisions we will face. Overall, they support my personal vision for our Engineer Regiment:

(continued on page 62)

Lead The Way

By Command Sergeant Major Robert J. Wells
United States Army Engineer School

As you know, the Army has announced that this year is "The Year of the NCO," and I'd like to address the Sergeants in our formation. This article is devoted to those great NCOs who taught me how to be a good Soldier and Sergeant and a decent human being.

What I've learned from my Sergeants has had a lasting impression. Without my knowing it, they've dictated the way I train and care for my own Soldiers and their Families. Being an NCO is harder today than it was 10 years ago. A 12- or 15-month deployment leaves you exhausted, physically and mentally. Period. No matter how you slice it, this stuff is hard. The stress of combat, accomplishing the mission, and taking care of Soldiers made me realize that there's a lot of hard work that needs to happen back in garrison to minimize the number of Soldiers wounded in combat. I know the enemy has a say in every engagement, but it's the way my NCOs reacted during those engagements that's carried the day for our unit. And to build a great team, it takes some hard thinking, detailed planning, and solid execution once we start training at R+91.

My NCOs have taught me the value of acting on those hard lessons learned from the last deployment and from our brothers and sisters who are deployed now. I don't have all the answers, but there's a bunch of NCOs in my company who can help me figure this stuff out.

My Sergeant told me that he can't give me his full, undivided attention back in the rear like he did when we were deployed. He has a family that hasn't seen him these past 15 months, and they'd like to get to know their father. That doesn't mean he's going to completely ignore me, but it does mean that I have to behave myself, especially when my Sergeant's not around. He told me I should act like a decent human being. I had no idea what he was talking about, and I asked for clarification. So he sat the entire team down and gave us his philosophy on decency.

He said, "There are usually three things that get Soldiers in trouble—money, women, and compulsive behavior."

"Money is a powerful aphrodisiac, and right now your pocket is burning to spend as much of it as possible, but you've got to have patience. Remember how we took down that IED cell a few months back? It took us about 3 months to do it, but it was worth the effort. We took our time, gathered the intel, developed a plan, and executed it with no collateral damage. Everyone was happy, except the bad guys. Same goes for money. You've got this strong urge to go out and shoot (spend) anything that moves, but in the end you'll just create a lot of collateral damage, a debt you can't manage on your now-taxable private's pay, and everyone's gonna be mad at you, except the bad guys."

"Formal courtesy between a man and a woman is more important than it is between strangers. Never embarrass or tease your girlfriend in front of your buddies or in private. When you're out on the town, your first meeting engagement should be just like we do key leader engagements in-theater. Slow is smooth, and smooth is fast. Do your homework, get to know your subject, and slowly develop a good relationship based on honesty and trust. We don't take advantage of the Sheik's good nature and start putting our own plan into action without his consent. Same goes for a woman. You may think she's flirting with you, but really she's just being nice and conducting her own recon. You'll know you're doing things right if the happiness of your wife or girlfriend is essential to your own happiness. One last thing, you are never authorized to push around or hit a woman. No matter what she says or how drunk or how stupid you get. You can expect the full attention of the entire chain of command, from team leader to battalion commander, if you do."

"Being compulsive means that you're obsessed about one particular thing, and you just take it too far. Being a 'Barracks Rat,' sitting in front of a TV playing video games all weekend is one example. Drinking alcohol to excess is another example. Watching civilians on MTV or the Internet, going to the mall and outfitting your entire wardrobe with clothes that look more like costumes than anything else is another. Putting large plugs in your ears so it looks like you've got two little butts growing out of your earlobes…tattoos…piercings…and the list goes on and on. The object is to not lose your perspective. Just because you're in a combat zone doesn't mean that stuff like hygiene, courtesy to officers, uniform standards, maintenance, awards, reports, and ceremonies stop until we redeploy, now does it? It's the reason we don't keep you on the same equipment for the entire rotation. You'll reach tracer burnout, and it could get you or someone else hurt. Same theory applies back in the rear. You've got to have a wide variety of interests and spread your time out for your Family, your battle buddies, and your duties as a Soldier so you don't burn out on us. You are expected to maintain our standards of uniform, punctuality, weapons, equipment, and good behavior no matter where you are."

Thank you, Sergeant Barajas, lesson learned. I continue to be amazed by what our Sergeants are required to do—in combat and in garrison. It's our duty to ensure that they not only have all the tools in their kit bag to be a successful Sergeant but also to help them sort out their kit bag and train them on how to best use those tools.

Show The Way

Chief Warrant Officer Five Robert K. Lamphear
Regimental Chief Warrant Officer

As the third Regimental Chief Warrant Officer (RCWO), I am thrilled to join the Engineer School Commandant and the Regimental Command Sergeant Major in communicating with our great Regiment's Soldiers through the *Engineer Professional Bulletin*. What a great opportunity to inform and educate our engineer force about regimental and Army warrant officer issues. I'll use this venue to keep you updated on all things warrant officer in the areas of doctrine, organization, training, materiel, leadership and education, personnel, and facilities – the DOTMLPF domains.

The RCWO position was established as a result of the recommendation of the Chief of Staff, Army-chartered Army Training and Leader Development Panel (ATLDP) Phase III – Warrant Officer Study, published on 18 July 2002. The panel met to examine and make recommendations on the training and leader development of the Army's Warrant Officer Corps. The panel made 63 recommendations, grouped into four major categories: Army Culture, Training and Education, Manning, and Professional Development. One recommendation was to establish and resource a Chief Warrant Officer of the Branch position at proponent centers and schools where they did not currently exist. The RCWO's primary duties are as follows:

- Serve as the principal advisor to the Commandant on all matters pertaining to engineer warrant officers.
- Serve as a voting member of the Vice Chief of Staff, Army-chartered Senior Warrant Officer Advisory Council (SWOAC). The council provides Department of the Army (DA)-level integration and synchronization and advice to the Army leadership for career field-related issues.
- Act as the single regimental point of contact for engineer warrant officer issues and primary advocate/liaison for engineer warrant officer training/leader development issues.
- Assess, monitor, and solve problems related to training, professional development, morale, recruiting, retention, and readiness.
- Manage the engineer warrant officer recruiting program; evaluate accession packets for the Active Army, Army National Guard (ARNG), and United States Army Reserve (USAR).
- Develop and write the Regiment's position for warrant officer accessions, training, and professional development issues.

The Regiment has two warrant officer areas of concentration (AOCs)—utilities operation and maintenance technician (210A) and geospatial information technician (215D). With modularity nearly tripling the number of 210A positions and FM 3-0, *Operations*, placing stability and civil support operations on equal par with offensive and defensive operations, the 210A will play an increasingly important role in providing construction expertise and support to the Regiment, Army, and nation. The 210A can now be found in vertical construction platoons, survey and design detachments, prime power platoons, engineer brigades, maneuver enhancement brigades, combat support hospitals, division and corps headquarters, and the White House.

The 215Ds play a vital role in coordinating and supervising the collection, production, analysis, interpretation, and processing of geospatial information for the combatant commander. The Force Development Update (FDU) to add geospatial warrant officers to all brigade combat teams (BCTs), if approved, will nearly double the number of 215D positions within the Regiment. The 215Ds can be found in BCTs, division and corps geospatial teams, topographic companies, geospatial planning cells, and joint (COCOM) assignments. The growth in engineer warrant officers has created a great opportunity for noncommissioned officers to apply for the warrant officer program. Calendar year 2008 was the Regiment's best recruiting year ever as we approved and/or accessed 75 Active Army, ARNG, and USAR Soldiers to be engineer warrant officers. For information on becoming an engineer warrant officer, log onto the Army recruiting website at <*http://www.usarec.army.mil/hq/warrant* >.

The growth in engineer warrant officers is also changing how we train both our 210As and 215Ds. The Engineer School's Department of Training and Leader Development is in the midst of a comprehensive analysis of the 210A Basic Course which, when completed, will significantly improve the quality and breadth of technical training. The 215D Basic Course has already expanded to meet the changing requirements of the Army's geospatial community. I will detail the Warrant Officer Education System in the next issue of the *Engineer Professional Bulletin*.

This year's ENFORCE will feature the first Council of Engineer Warrant Officers and recognition of the Warrant Officers of the Year for the USAR and Active Army. The Council format will provide for a comprehensive warrant officer update for attendees and allow them to participate in the discussion of issues that will affect engineer warrant officers. Come join us!

In closing, this IS the best time in our Regiment's history to be an engineer warrant officer. As your RCWO, I will strive to keep you informed through this publication and other avenues as appropriate. For those of you in harm's way, stay safe and continue to do the fantastic work that is keeping this country safe. Essayons!

Moving Out With Great Engineers

By Lieutenant General Robert L. Van Antwerp

Our historic workload both here and abroad—plus the addition of "The American Recovery and Investment Act (Stimulus)"—focuses us on having *Great Engineers* with the requisite competencies to "get 'er done." Our Soldiers and Civilians are working in 33 countries providing full spectrum engineering services—from sapper and construction engineering in combat to water resource planning and construction on our river systems to geospatial engineering to disaster recovery and reconstruction.

The Chairman of the Joint Chiefs of Staff, Admiral Mike Mullen, has recognized the need for developing and growing great leaders and engineers. He demonstrated this requirement when he published his new doctrinal guidance on how our future force must function and the capabilities it needs to possess.

Our engineers must be able to serve an array of customers in a diverse set of circumstances, from partnering with local tribal leaders to designing a sluice gate on a levee to building a bridge across a river in Iraq. Our engineer force must be able to synchronize individual talents and overall effects in order to offer a full suite of engineering skills. It will take Great Engineers to accomplish these important missions.

As Admiral Mullen states, "Leaders down to the lowest levels must be comfortable acting on their own authority based on an understanding of the larger situation and an appreciation for the broader implications of their actions..." That puts a premium on competency!

We have a significant mission ahead. What a great time to be an ENGINEER!

Lieutenant General Van Antwerp is the 52d Chief of Engineers and Commander of the United States Army Corps of Engineers.

Bassett Army Community Hospital in Fort Wainwright, Alaska, is a modern $215 million medical facility built by the Corps's Alaska District. This 259,500-square-foot medical building replaced a hospital built before Alaska became a state. The construction and modernization of quality-of-life facilities such as this represent the many engineering services that our Nation, our Soldiers, and their Families depend on each day.

Lay Hold! Heave!

Building Speed: Excitement and Satisfaction in Pushing the BGE Flywheel

Compiled by Colonel Jerry C. Meyer from information provided by past and present members of the Building Great Engineers (BGE) Council of Colonels: Colonel William H. Haight, Colonel Timothy O'Rourke, Colonel James Wong, Colonel Janice Dombi, Mr. Steven H. Tupper, Colonel Robert A. Tipton, Colonel Jose Cepeda, Colonel Andrew Phillips, and Dr. Robert Wolff

". . . why does the Flywheel Effect work? Because more than anything else, real people . . . want to be part of a winning team. They want to contribute to producing real results. They want to feel the excitement and the satisfaction of being part of something that just flat-out works. When people begin to feel the magic of momentum—when they begin to see tangible results and can feel the flywheel start to build speed—that's when they line up, throw their shoulders to the wheel, and push."—Jim C. Collins[1]

Background

Seeking to reverse quantifiable degradation to engineer leader technical and tactical competency, the Fort Leonard Wood portion of ENFORCE 2008 built on the foundation of six Engineer Leader Technical Competency (ELTC) work groups:

- Future Roles, Missions, Delivery Methods
- Accessions
- Training and Education
- Employment
- Retention
- Strategic Communications

Less than 60 days later, the result was a Chief of Engineers-approved *Building Great Engineers* Campaign Plan with nearly 40 initiatives. For those with Army Knowledge Online (AKO) access, that plan can be read on the Engineer School Knowledge Network (ESKN).

Seven months later (as of this 1 March writing), what has become of the efforts of those who have remained engaged and put shoulder to the flywheel? Too often "good ideas" languish and die from lack of follow-up and effort. Did we really begin doing what we said we were going to do? Is the flywheel turning? The intent of this article is to inform the Engineer Regiment on the current status of many BGE actions initiated by the plan and the way ahead in increasing engineer leader technical and tactical competency for full spectrum operations in an era of persistent conflict.

"Don't wait until everything is just right. It will never be perfect. There will always be challenges, obstacles and less than perfect conditions. So what. Get started now. With each step you take, you will grow stronger and stronger, more and more skilled, more and more self-confident, and more and more successful."—Mark Victor Hansen

First, a salute to the leaders who provided great value and now have moved on to other duties! These include Major General Gregg F. Martin, Colonel William H. Haight, Colonel Everett McDaniel, and Colonel James Wong. The power of these leaders' mighty shoulders overcame the inertia of rest on our great wheel!

Next, there are signature accomplishments on each spoke. For the ***Futures*** work group, the force structure in corps and division staffs is being addressed to improve engineer expertise, and we now see the return of military personnel to public works in the foreseeable future. ***Accessions*** has stirred up a significant review of how the Army runs the business of bringing in new lieutenants and leveraging their academic backgrounds. ***Training and Education*** has pushed a suite of teaching and curriculum improvements inside the United States Army Engineer School. ***Employment*** has redrafted the description of an engineer's career in Department of the Army (DA) Pamphlet (Pam) 600-3, *Commissioned Officer Professional Development and Career Management,* thus setting a modern paradigm for a new generation of sappers, builders, and geospatial engineers. ***Retention*** is on the verge of reimbursement of Professional Engineer (PE) exams and preparation fees. ***Strategic Communications*** has developed DA-level marketing materials that are making a difference.

Finally, you are invited to review the following detailed summaries and to attend the work sessions at ENFORCE 2009 that will push this critical work forward.

Future Roles, Missions, Delivery Methods

Work group leadership has been passed to Colonel Timothy O'Rourke and Lieutenant Colonel Vernie Reichling, Office of the Chief of Engineers–Pentagon (OCE–P). The work group founder, Colonel William H. Haight, has moved to the Joint Staff and still remains engaged.

Progress

Engineer Staff Structure in the Brigade Combat Team, Division, Corps, and Army Service Component Command. To date, the Vice Chief of Staff, Army (VCSA) has approved the force structure for the corps and division staffs; there were no significant changes for engineers. The Army is conducting a holistic review of the brigade combat team (BCT) structures. Currently, one 215D/W2 is an addition, and there is a reduction of one 21B/03 in the heavy brigade combat team (HBCT)/infantry brigade combat team (IBCT).

Gaining Support in the Joint Operational Engineer Board for Capacity Development. The new capstone concepts for joint operations, the joint operational environment, and the joint operational concepts include capacity development. The Joint Engineer Capabilities-Based Assessment will address the needs of capacity development across the engineer components of the Services.

Coordination With Other Centers/Branches to Better Synchronize Shared Missions With the Intent to Eliminate Redundancy/Increase Synergy. Efforts have largely centered on stability operations. The Base Camp Integrative Capability Development Team continues to move toward a capabilities-based assessment, and recently the Assistant Chief of Staff for Installation Management (ACSIM) presented a concept to the VCSA on expeditionary base camps; however, it falls short of addressing the strategic issue of defining policy for expeditionary basing. Additionally, we are engaging with the United States Army Civil Affairs and Psychological Operations Command on developing doctrinal concepts for engineer support to their operations with a goal of formalizing this relationship for the Regiment.

Development of a Force Design Update for a Strategic-Level Engineer Brigade. This is on hold due to the Army being overstructured. It is unlikely that this structure will be addressed until after the release of the new administration's *National Defense Strategy*. The Engineer School is determining the feasibility of this requirement.

Return of the Director of Public Works (DPW). The Installation Management Command (IMCOM) initiative and support for this is pending approval in Total Army Analysis (TAA) for FY2010-2015, but it is an unresourced requirement. These positions will have to be readdressed in TAA for FY2012-2017. Additionally, the engineer chapter in DA Pam 600-3 was submitted reflecting the BGE concepts and career paths.

Way Ahead

The United States Army Maneuver Support Center (MANSCEN) continues to provide input to the BCT holistic review. Members of the Futures work group will continue to define capacity development as a task in the Joint Capabilities-Based Analysis and Engineer Brigade Headquarters DOTMLPF Study. We will continue to engage the United States Special Operations Command on civil affairs doctrine and engineer support. The Engineer School will work on determining feasibility of developing a Force Design Update for the strategic engineer brigade. We will continue to readdress resourcing DPW requirements in TAA 12-17, per the above update.

"You don't make progress by standing on the sidelines, whimpering and complaining. You make progress by implementing ideas."— Shirley Hufsteddler

Accessions

Colonel Janice Dombi, who recently assumed command of the United States Army Corps of Engineers (USACE) South Pacific Division, heads this work group, which was previously chaired by Colonel Everett McDaniel and Colonel James Wong.

Progress

Access More Degreed Engineers. Results from attempting to access more degreed engineers into the branch are in. Despite a concerted effort at Warrior Forge, Reserve Officer Training Corps (ROTC) branch selection resulted in only

29 percent of officers with engineering degrees being accessed into the Engineer Branch. This is down from 35 percent degreed engineers with the class of 2008, in which little effort was expended to recruit degreed engineers into the branch. Twenty-nine cadets with engineering majors had engineer as their first branch preference, yet did not receive the Engineer Branch. Popularity of the branch went from 7th to 5th, mostly on the 50 percent rise of nonengineers who wanted the branch as their first choice. Among degreed engineers, first choice selection rose by about 10 percent. Had it been specified by Army regulation (AR), the branch could have had 30 to 40 percent more accessed officers with engineering degrees. One-third of those who branched engineer had a degree in political science, criminal justice, history, international relations, or psychology. As a result of these findings, United States Army Cadet Command is now willing to explore branching degreed engineers to lessen the effect of the order of merit listing in the process (not only for engineer, but also other degrees/branches).

For the combined classes of 2009 that were accessed from the United States Military Academy (USMA) and ROTC, 41 percent had engineering degrees (USMA had about 58 percent degreed engineers in the class of 2009, while having well over 60 percent from the class of 2008). If all degreed engineers who selected the Engineer Branch as first choice had been allowed to branch engineers, almost 53 percent of the total USMA and ROTC class would have had engineering degrees.

Officer Candidate School (OCS) classes with an engineer captain leader appear to have higher selection rates for the branch. In 2009, 50 percent of engineer degreed Soldiers selected the Engineer Branch.

Professors of Military Science at Engineer-Centric ROTC Schools. The United States Accessions Command held a summit to talk to Professors of Military Science (PMSs) at engineer-centric ROTC schools to promote engineering. There appears to be a correlation between the branch of the overseeing PMS at the college and branches chosen by the ROTC cadets ("be like me" syndrome). Colonel Dombi has requested feedback from this summit.

Way Ahead

Changing AR 600-3, *The Army Personnel Proponent System,* will have significant impact on determining the number of engineer-degreed cadets branching engineer. Colonel Dombi will lead a breakout group during ENFORCE on broadening an "adopt an engineer" program.

"The great thing in the world is not so much where we stand, as in what direction we are moving."— Oliver Wendell Holmes

Training and Education

Colonel Jerry Meyer, Engineer School Director of Training and Leader Development, and Mr. Steven Tupper, Missouri University of Science and Technology (Missouri S&T), continue to head this work group.

Progress

The Training and Education work group has made solid progress, albeit mostly internal to the Engineer School, for changing courses and improving instruction.

Improving Engineer School Instructors. In consonance with improving Engineer School instructors, the School has implemented a mandatory interview process in addition to the formalized instructor criteria provided to Human Resources Command (HRC) several months ago. Approximately eight Engineer School instructors are participating in the USMA Master Teacher Certification Program, after a visit by Dr. Mark Evans from West Point's Center for Teaching Excellence. Instructors are already halfway through their first year of the program, learning to be better in their primary mission. Several instructors also completed a speed-reading course for college credit via the University of Central Missouri.

Maximizing Learning Effectiveness Within the Existing Training Infrastructure. The Engineer Basic Officer Leader Course (BOLC) has been aligned with FM 3.0, *Operations*. In response to overseas unit requests, more than 300 officers, warrant officers, and noncommissioned officers (NCOs) have received 20 hours of contracting officer's representative (COR) training via Defense Acquisition University online training. Environmental officer certification is now being requested as course growth for BOLC, Engineer Captains Career Course (ECCC), and 210A Warrant Officer Course. The Society of American Military Engineers (SAME) and the University of North Dakota are in the process of signing an agreement giving Soldiers an opportunity to earn an ABET (formerly Accreditation Board for Engineering and Technology)-accredited bachelor of science degree in engineering online (some lab time required). (See the Strategic Communications work group's progress on page 12.) In February 2009, the Engineer School Department of Instruction invited the International Committee of the Red Cross to speak to the ECCC. The ECCC partnered with academia (Missouri S&T), SAME, and the Missouri State Emergency Management Agency (SEMA) to conduct Structural Assessment Visual Evaluation (SAVE) training, not only to make officers available for state disaster assistance during their student time but also to hone wartime damage assessment skills. Media training, in partnership with journalism students from the renowned University of Missouri (Columbia) School of Journalism, was so successful that it is being developed for use across the United States Army Military Police School and the United States Army Chemical, Biological, Radiological, and Nuclear (CBRN) School. Captains are taught principles of dealing with the media and are videotaped in scenario-driven interviews for peer analysis.

Improvements in Engineer School Methods of Instruction. Testing out/validation of instruction continues to be developed. Experimentation to test out student officers and offer more advanced substitute courses has revealed a student reluctance to attempt validation and a need to formalize and grow alternative subjects, should students "validate" normal course offerings. Additionally, Dr. Brock Barry, Purdue

University, and soon-to-be USMA civil engineering professor, spent a few days at the Engineer School, made recommendations for classroom improvement, and began forging a closer relationship for a USMA–Engineer School partnership. Captain–lieutenant mentorship/integration began where feasible between ECCC and BOLC students. For example, students who are lieutenants must receive a company operations order (OPORD) given by a captain who is being graded by a senior evaluator, and lieutenants must subsequently write a platoon OPORD for evaluation. Additional hands-on activities and integration across the BOLC–ECCC–NCO–warrant officer courses have occurred via tactical exercises without troops (TEWTs).

Technology in the Classroom. Use of technology in the classroom continues to progress. DARWARS Ambush! route clearance simulation training within BOLC and the Advanced Noncommissioned Officer Course (ANCOC) collaboration has been very useful and continues to expand and improve. The "Think Like a Commander" United States Army Training and Doctrine Command (TRADOC) leadership simulation was not as useful as hoped. "Turnitin®" is being used to assist students with writing assignment documentation and as a bulwark against occasional plagiarism. Tablet personal computers (PCs) have been purchased for one ECCC small group, and the second pilot of use of the Tablet PC and e-books is underway. The first pilot experienced organizational and technical challenges. Piloting has been completed and a purchase of Classroom Response Systems (CRS) is underway for BOLC. CRS is a software environment for developing and administering questions via PowerPoint®. Students input their answers using wireless devices, and a receiver connected to the instructor's computer tabulates the results for immediate feedback that is visible to all. Although uses of the system are numerous, this system particularly enhances interactive, student-centered learning by real-time compilation of student responses to checks on learning via wireless technology. Feedback to students and instructors allows for more efficient and effective learning.

Warrant Officer 210A Course. This course has been redesigned, with much more emphasis on technical competency and certification. Course growth from 12 to 26 weeks is now being worked through the TRADOC course development process.

Civilian Education Options. The civilian education options for the Regiment are still largely the cooperative degree program with Missouri S&T. The ECCC Reserve Component students now have an avenue to achieve an engineering master's degree, and a follow-on doctoral program has been publicized by Missouri S&T. A series of new, online ABET-accredited engineering degrees via the University of North Dakota is explained in the Strategic Communications work group progress.

Way Ahead

Most of the effort during the past several months has been internal to the Engineer School. External partnership needs to be reinvigorated. This emphasis will include multi-Service and joint training, officer exchanges, and concepts like the Joint Engineer Training Center of Excellence. Partnership with the USACE courses and joint, interagency, intergovernmental, and multinational (JIIM) educational opportunities are needed. Since the various Service chief engineers are scheduled to speak at ENFORCE 2009, rejuvenation of these partnerships is a goal.

A memorandum formalizing Engineer School participation in the USMA Master Teacher Certification Program will be written. The Engineer School Directorate of Training and Leader Development will investigate establishment of a funded graduate degree program with follow-on assignment to the School. It will also develop an instructor recruitment program from higher-performing ECCC graduates. The Engineer School is also exploring the possibility for general officer (Engineer School Commandant) senior rating of School officer instructors. Increased leveraging of TRADOC's Learning Services Division video teleconference training will also improve instructor competence.

The Engineer School Department of Instruction should soon complete planning for and execution of the Captains Career Course common-core redesign, as mandated by the new TRADOC Commanding General. How or if this initiative supports BGE is yet to be determined.

The ability of students to get an ABET-accredited engineering bachelor of science degree from SAME-brokered partnership with University of North Dakota will require Regiment-wide promotion.

Impacts and implementation of a new Noncommissioned Officer Education System (NCOES) will be determined over the course of the next several months.

"Human progress is neither automatic nor inevitable. . . Every step toward the goal . . . requires sacrifice, suffering, and struggle; the tireless exertions and passionate concern of dedicated individuals." — Dr. Martin Luther King, Jr.

Employment

Colonel Jose Cepeda, Engineer School Deputy Assistant Commandant for the Reserve Component, assumed leadership of the Employment work group when Colonel Robert Tipton assumed the duties of Engineer School Commandant late last fall.

Progress

"Green Pages" is a personnel tool designed to display an individual's talents, experience, and most desired assignments beyond current capabilities. Rather than contracting this initiative, AKO has begun improving the "My Profile" section, which will become the foundation of the Green Pages. Supplied with this additional data, HRC will be better informed in selecting the most qualified individuals for available positions or for consultation or reachback support.

DA Pam 600-3. The Engineer School submitted a final draft of DA Pam 600-3, Chapter 14, Engineer Branch career paths, near the end of December 2008. The new manual, which is to be published in the spring/summer of 2009, is out for DA-level staffing. The rewrite reflects a theme of continuous education and broadening both inside and outside of positions within the Engineer Branch. The objective is to promote the pursuit of education and certification throughout an officer's career and identify both key and developmental positions for each rank that broaden an officer's knowledge of all facets of engineer operations, to include geospatial, USACE, facilities, combat, construction, and maneuver support. When combined with a quality senior mentorship and training program, this manual will provide a road map to producing high-quality engineer officers for our Regiment. A special team will be formed to analyze at least three courses of action, study potential impact on the Regiment, and make recommendations at ENFORCE 2009.

Way Ahead

Further definition, scope, and boundaries are needed for Green Pages, as well as talent-matching rules. A pilot program of its use will follow. There will be continued collaboration among the Engineer School, DA G1, G6, AKO, and HRC.

A major breakout group session for ENFORCE will address engineer military occupational specialty (MOS) and skill identifier (SI) considerations, as well as professional requirements and certifications. This ENFORCE breakout group will be led by Lieutenant Colonel Keith Dupont. The issue is whether to create two or more specialized officer area of concentration (AOC) codes within the Engineer Branch and manage our officers according to the AOCs. While the current DA Pam 611-21, *Military Occupational Classification and Structure*, lists 21A, 21B, and 21D as separate and distinct AOCs, DA Pam 600-3 doesn't address the differences, and Engineer Branch and the Army aren't really managing our officer population by separate AOCs. This will be a major focus topic for this year's *Building Great Engineers II* ENFORCE Conference. The courses of action (COAs) are as follows:

- ***COA 1:*** *Develop Additional Areas of Concentration.* AOCs create "minibranches" within the Engineer Branch. Officers will be accessed into each AOC based on their educational background and experience, instead of requiring that all officers fulfill all duty positions. By being grouped into concentrations, officers will experience similar positions during their career. This will incrementally develop officers' abilities and ensure that those competencies are not lost by misaligned position requirements and personnel capabilities.
- ***COA 2:*** *Develop Skill Identifiers.* SIs identify duty positions that require individuals with specific skills. Officers are not required to fill a position with which they share a skill code; however, personnel managers are able to quickly identify qualified personnel for specialized positions during the assignment process. Because SIs are coded in the modified table of organization and equipment (MTOE), the training that individuals need to fill those positions is funded by DA.
- ***COA 3:*** *Increase the Number of Project Development Skill Identifiers.* Project development skill identifiers (PDSIs) are codes given to personnel based on specific experiences or training they have received. PDSIs allow assignment officers to quickly identify personnel with specific backgrounds. Because PDSIs are not coded in the MTOE, there is no forcing function to provide training; however, they allow the branch to better employ officers with specific skills and experiences.

There is a need to continue studying existing HRC policies and practices and identify which must be changed.

Another employment-related breakout group at ENFORCE 2009 will determine how to best get engineers into short-term USACE/DPW positions and establish a "partnership program" to link USACE/DPW with field units. This breakout session will be led by Colonel Janice Dombi.

The Regimental Command Sergeant Major will be working BGE issues in support of NCOs.

"Progress always involves risk; you can't steal second base and keep your foot on first base."—Frederick Wilcox

Retention

Colonel Andrew Phillips, the United Kingdom MANSCEN Liaison, continues to lead the Retention work group of BGE.

Progress

Reimbursement of Fees. The reimbursement of fees associated with PE license renewal and for gaining a PE license for the first time, regardless of the current position held by the applicant, was investigated. A proposal to gain authorized delegation for USACE/Engineer School to fund this initiative has been submitted to the Office of the Secretary of Defense (OSD), and a decision is expected soon. If successful, a policy letter will be issued. In parallel, details of other potential sources of funding for PE licensing (such as tuition assistance and the GI Bill) will be publicized Regimentwide as part of the strategic communications plan.

Branch Mentorship. Branch mentorship for junior engineer officers employed outside an engineer chain of command is a complex issue that will be examined in more detail by a breakout group at ENFORCE 2009.

Transportability Between the Regular Army and Reserve Component. The issue of transportability between these components in order to improve retention is an issue that is being examined Armywide by Headquarters, DA, and progress is being monitored to identify any targets of opportunity for the Engineer Branch.

Way Ahead

A plan for leading an ENFORCE 2009 breakout group on branch mentorship for junior engineer officers employed outside an engineer chain of command has been drafted. If this is an area of interest to you, plan to join the breakout session.

We continue to monitor progress of the Continuum of Service Opportunity initiative to remain abreast of progress and identify targets of opportunity for the Engineer Branch.

"He who cannot change the very fabric of his thought will never be able to change reality, and will never, therefore, make any progress." — Anwar Sadat

Strategic Communications

Dr. Robert Wolff, Executive Director, Society of American Military Engineers (SAME), is the work group lead.

Progress

Marketing Brochure. An Army Engineer Regiment (AER) marketing brochure was printed and distributed via United States Army Cadet Command and USACE districts. It has since been revised to correct some missing units. A brochure is being reprinted for wider distribution.

AKO/Engineer School Websites. An AER briefing, posters, and frequently asked questions (FAQs) were provided on AKO and Engineer School websites.

Visit Engineering Schools/ROTC Units. USACE implemented an initiative to visit engineering schools and ROTC units to market AER.

DA-Level Marketing Opportunities. The work group obtained a DA point of contact for the McCann Erickson contract and intends to follow up to ascertain DA-level marketing opportunities.

Online Engineering Degrees. SAME negotiated with the University of North Dakota (UND) regarding online engineering degrees. When the memorandum of agreement is signed and implemented, UND will offer undergraduate ABET-accredited online degrees in chemical, civil, mechanical, and electrical engineering. UND will possibly add petroleum engineering in the near future. These degrees require at least 125 (semester) credits to be obtained in an estimated six-year period, predicated on an individual taking two courses per semester. The completion time will be shorter if an individual is awarded credits for experience in an engineering field or has undergraduate credits that can be transferred to the UND degree program. The only resident requirement is for approximately five weeks of laboratories at UND (the number of weeks/visits to UND may differ depending on labs that students have already taken at another college/university) or other location sponsored by SAME and approved by UND. UND assists in the arrangement of inexpensive housing for students while they are attending these resident programs. It is anticipated that most of the cost will fall under current tuition assistance available to military personnel.

Way Ahead

The work group will continue to support the communications needs of the *Building Great Engineers* Campaign Plan and other BGE work groups. Signing and implementation of the SAME–UND memorandum of agreement is expected very soon. The work group will continue to update and improve the package of documents that is now on the Engineer School public website for use in talking to high school and college students about the opportunities for a career (military and civilian) in the Engineer Regiment.

We need to develop a concept and cost estimate for an 8- to 10-minute video that can describe the elements of the AER for use in recruiting and upload it to the regimental websites and YouTube. Social networking is next among our targets.

In the near future, we intend to identify points of contact who can best represent the career opportunities in the United States Army Reserves, Army National Guard, USACE, and IMCOM for officers leaving active duty early in their careers.

Conclusion

With measurable progress across all BGE work groups, major progress occurred with SAME's establishment of online ABET-accredited engineering degrees via the University of North Dakota; rewrite of DA Pam 600-3, Chapter 14, Engineer Branch career paths; initial decisions and development of Green Pages via AKO; numerous Engineer School internal training and education initiatives; and development of strategic communications media for use by all members of the Regiment.

Five BGE breakout work groups have been identified for ENFORCE 2009. Most profound will be the work regarding which course of action to pursue in commissioned officer professional development and career management (generalization versus specialization). This is a significant milestone and will guide future progress for many initiatives across several BGE work groups.

Several unsung heroes of the Engineer Regiment, unmentioned here, have shouldered the load in making the first push of the flywheel. They have experienced the excitement and satisfaction of making a lasting, positive, significant difference for the Regiment.

"It behooves every man to remember that the work of the critic is of altogether secondary importance and that, in the end, progress is accomplished by the man who does things."—Theodore Roosevelt

Where's your shoulder? Lay hold! Heave!

Endnote

[1] Jim C. Collins, *Good to Great,* Harper Business, New York, 2001.

A Quick Look Across the DOTMLPF Domains

By Colonel James R. Rowan (Retired)

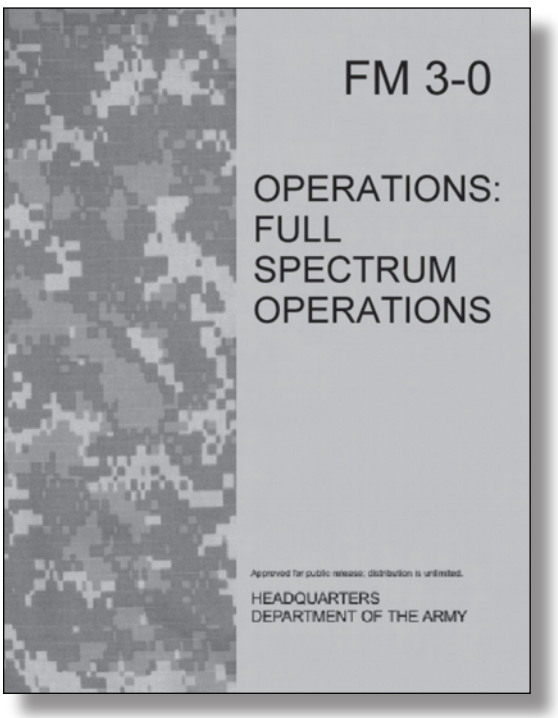
There are several actions ongoing at the United States Army Engineer School and the United States Army Maneuver Support Center (MANSCEN) directorates at Fort Leonard Wood, Missouri. Although there are too many to discuss in a single article, this one will identify one or two areas in each of the key domains—doctrine, organization, training, materiel, leadership and education, personnel, and facilities (DOTMLPF). If you haven't already done so, it's probably best to go back to the two "Clear the Way" articles at the front of this bulletin. Colonel Tipton's column highlights the strategic messages for the Regiment and Colonel Watson's column provides the commandant's vision and philosophy. Reading these two short articles first is necessary to put the DOTMLPF actions in the right perspective.

Doctrine

Our keystone field manual (FM) 3-34, *Engineer Operations*, has been approved and will be online shortly at the Reimer Digital Library. All engineer leaders should read the manual and understand how the Regiment is designed to operate within the modular force. FM 3-34.22, *Engineer Operations–Brigade Combat Team and Below,* can be accessed and downloaded in electronic format from the Reimer Digital Library at <*http://www.adtdl.army.mil*>. Also due out soon is our other new organizational manual, FM 3-34.23, *Engineer Operations–Echelons Above Brigade Combat Team*. Both of these manuals have had all the necessary reviews completed and have been staffed extensively and validated through a Fort Leavenworth-sponsored Combined Arms Assessment Team (CAAT) visit to Iraq this year. FM 3-34.230, *Topographic Operations*, is being replaced by FM 3-34.600, *Geospatial Engineering*, and the initial draft has been delivered to the Engineer School. We will be soliciting your comments on this draft manual. There are also two new MANSCEN doctrinal publications that you should become familiar with—FM 3-90.31, *Maneuver Enhancement Brigade (MEB) Operations*, and FM 3-10, *Protection*. The *MEB Operations* manual can be accessed and downloaded in electronic format from the Reimer Digital Library at <*http://www.adtdl.army.mil*>; the *Protection* manual is in draft form and can be obtained by contacting Lieutenant Colonel Hank Thomsen at <*leon.mdottddengdoc@conus.army.mil*>.

Organization

Getting the right engineer command and control (C2) into the structure is crucial and remains the top organizational priority. We work this every day and know how important it is. We also know that we don't have it exactly right yet, but thanks to you, we have continued to provide excellent support to commanders with whatever structure is in place. While all C2 is important, we believe that our most critical nodes, given the current organizational structure, are the brigade combat team (BCT) engineer and the functional engineer brigade headquarters. Colonel Tipton has already discussed the challenges in the BCT. Above the BCT level, we must fully define the roles and responsibilities of the functional engineer brigade and deconflict those roles with the MEB. We are working on a study with the Office of the Chief of Engineers–Pentagon (OCE–P) and the United States Army Training and Doctrine Command (TRADOC) Analysis Center (TRAC)–Leavenworth to formally document the roles and responsibilities of the engineer brigade.



Publication of our capstone manual, FM 3-34, is imminent and will align our doctrine with FM 3-0, *Full Spectrum Operations.*

The modular engineer force and the force pool are quickly coming on line. We went to a modular force on purpose. Since there aren't enough engineer units to embed all the required engineer structure into 76 BCTs across the Army, we must have our units in a force pool so they can be task-organized when required. We worked hard to make most of our modular

Smith Hall, home of the Counter Explosive Hazards Center

forces very focused in their mission. We've heard comments from the field that people want more multifunctional modules. We are studying this, but would ask for the time being that we let the modular force get fielded first, and that we don't make radical changes until we've had the chance to fully understand and assess the force across the full spectrum of operations—not just stability operations—that we have designed.

The Army has worked very hard to field the clearance companies. The challenge has been that almost all the clearance equipment has gone directly into the combat theaters to support operational needs statements. While this has delayed standing up the organizations, it has provided a needed capability in-theater, and we have learned a lot of valuable lessons with regard to route and area clearance. Based on our experience and comments from the field, we will adjust the clearance company structure in the near future.

We are standing up forward engineer support team–advanced (FEST–A) and forward engineer support team–main (FEST–M) organizations across the Regiment. These are critical links to the United States Army Corps of Engineers (USACE) Field Force Engineer program and provide a tremendous technical capability to our formations. These teams have been outstanding in both War on Terrorism and civil support missions, and it's a great accomplishment that they will now be formally recognized as part of our engineer structure and resourced with personnel and equipment.

We have recently gained support from TRADOC to have a geospatial warrant officer (215D) added to the heavy brigade combat team (HBCT) and the infantry brigade combat team (IBCT), as well as the armored cavalry regiment (ACR). Previously, this only existed in the Stryker brigades, but due to the outstanding performance of these terrain experts, the Army has realized that we need this capability across the force. If this is approved by the Army, it will take a couple of years for us to grow enough 215Ds to fill all of these positions, but this is a big win for the Army.

Although it isn't final yet, we are optimistic that we will see engineers added into the future combat systems (FCS) brigade formation. Many of the traditional engineering problems were assumed away in hope of breakthrough technologies, but the reality of the FCS capabilities will require engineers to be organic to the future brigade combat team (FBCT). We have proposed a structure similar to the engineer formations in the HBCT, but with the addition of a gap-crossing capability that the HBCT does not have. Again, this is predecisional, but we are fully engaged in this effort and the engineering requirements are being addressed at the highest levels of the Army. (POC: Lieutenant Colonel Steve Danner at <*Stephen.Danner@us.army.mil*>)

Training

Under the new TRADOC Center of Excellence model, the Engineer School is postured to focus on training and leader development. We have processes to continually review all of our institutional courses to ensure that they are relevant and current. Based on FM 3.0 and feedback from the field, there are numerous topics we'd like to add to courses. The constraint is that TRADOC has mandated zero growth in course lengths while simultaneously adding more Army-directed training. We have been successful in gaining approval to run some pilot topics that will add 3 to 5 days to officer, warrant officer, and noncommissioned officer (NCO) courses. Key topics that have been or will be added to courses include contracting officer's representative (COR), more in-depth project management, and joint engineer operations. Recent efforts to move toward less classroom lecture and more hands-on instruction include increased use of tactical exercises without troops (TEWTs) and introduction of interactive simulations, such as DARWARS Ambush! (route clearance simulation); Think Like a Commander and Gator 6 (leadership simulations); and planned trial use of virtual training to include the "Virtual Route Clearance Trainer" and improvised explosive device defeat (IEDD) training via Dismounted Soldier. Additionally, more integrated training among captain and lieutenant courses and lieutenant and NCO courses is occurring. Slowly, the Engineer School is offering the ability of students to "test out" of selected training within courses in exchange for additional training and education in other pertinent subjects or deeper training and education within the validated curriculum.

The Engineer School's Directorate of Training and Leader Development continues to struggle in proper military manning

MANSCEN will recommend to the VCSA that all military working dog handlers be placed in a single MOS.

of instructor and training developer positions. We do need help from our brigade commanders and command sergeants major to identify the best candidates to serve as our small-group leaders to teach and develop our leaders of tomorrow. The commandant is reviewing officer record briefs (ORBs) of potential small-group instructors for assignment to the Engineer School for spring/summer 2010. If you have a strong company commander with downrange experience projected to come out of command next spring/summer, please talk to that person and send me his or her name. These officers will be personally managed by the commandant and will be well taken care of. More important, this small group of officers will have a profound effect on the quality of our future Regiment. TRADOC is currently considering some major changes to the Captains Career Course. One of the goals is to increase and enhance the common training that all captains receive. Our concern is obviously that we cannot afford to reduce the branch-specific training and the technical engineering aspects of the curriculum as we implement the *Building Great Engineers* (BGE) Campaign Plan. (POC: Colonel Jerry Meyer at <*Jerry.Meyer@us.army.mil*>)

Probably our most relevant and cutting-edge ongoing training is at the Counter Explosive Hazards Center (CEHC). So far, we've trained more than 2,000 U.S. Soldiers, Marines, and coalition forces this year in the following courses: Route Reconnaissance and Clearance Operations–Operator, Leader, Sapper, and Maintainer; Counter Explosive Hazards–Planner; Intermediate Search Operations; Area Clearance; and Improvised Explosive Device Defeat–Train the Trainer. The outstanding job the CEHC team is doing was validated during the CAAT visit to Iraq in September and by the number of Soldiers who provided positive comments on the training and the equipment. CEHC continuously adapts the training it provides, and the training programs now focus on training teams rather than individual training. We are incorporating many search techniques into the training as well. Engineers across the Regiment should take great pride in the work they are doing to defeat improvised explosive devices (IEDs) and the work CEHC is doing to advance this effort. Over the past year, the international community has recognized that our U.S. engineers and the CEHC comprise the single most qualified organization to train Soldiers and leaders on route clearance operations. International military engineers are eager to receive this highly coveted training. Within the past few months, we trained engineers from Canada, Turkey, and Korea, as well as having an exchange with the Ukraine. Over the next few months, we will be training engineers from France, the United Kingdom, and Germany and will hold an exchange with the Dutch and Israelis. The CEHC has truly become a center with unique expertise found nowhere else in the world right now. We are currently updating the CEHC concept plan to institutionalize this training in TRADOC. (POC: Colonel Dave Theisen at <*David-Theisen@us.army.mil*>)

Materiel

Our materiel acquisitions and fieldings are getting the right equipment to our next deploying units and to the units in-theater to meet mission requirements. We continue to have challenges to field continental United States (CONUS) units the equipment and training assets they need prior to deployments. The acquisition community is working hard to meet these needs. The training base has acquired mini construction equipment to augment the fleet of hydraulic excavators (HYEX) and dozers, because the full-size equipment is needed for missions elsewhere. The first suite of 30 HYEX computer simulators has been installed at Fort Leonard Wood, with dozers, motor graders, scrapers, and loaders to follow.

Our materiel team is tracking more than 100 systems, and the current commandant's top 10 priority systems are as

follows: Joint Assault Bridge (JAB), High-Mobility Engineer Excavator (HMEE), Medium Mine-Protected Vehicle (MMPV), Mine-Protected Clearance Vehicle (MPCV), Vehicle-Mounted Mine Detector (VMMD), Digital Topographic Support System (DTSS), 2.5 cubic yard Loader, Special Construction Equipment, 4-5 cubic yard Loader, and the Ribbon Bridge Transporter. The review cycle for updating our "1 to n" lists will take place later this spring. (POC: Lieutenant Colonel Steven Wall at <*Steven.Wall@us.army.mil*>).

Leadership and Education

Our highest priority in the leadership area remains improving the tactical and technical skills of our officers, warrant officers, and NCOs. We've worked this hard for the past year and have made real progress on the *Building Great Engineers* Campaign Plan. I'm really pleased at the way we have been able to partner with the field and with the Society of American Military Engineers (SAME) to advance this critical program. Progress toward *Building Great Engineers* includes advancements in the following working group areas: Future Roles, Missions, and Methods of Delivery; Accessions; Training and Education; Employment; Retention; and Strategic Communications. Thanks to all the people in the field and thanks to SAME for leading and participating in these work groups.

Be watching for changes in both officer and NCO education in the very near future. TRADOC is looking at a Captains Career Course redesign and really focusing on the common core tasks that all captains need to be trained on. Our challenge will be to ensure that we maintain or improve the amount of branch-specific technical training that our captains receive. The Noncommissioned Officer Education System (NCOES) will also transform. NCOs will attend an Advanced Leader's Course and a Senior Leader's Course. These courses will basically cover the topics that are now taught in the Basic Noncommissioned Officers Course (BNCOC), the Advanced Noncommissioned Officers Course (ANCOC), and the First Sergeant's Course. (POC: Colonel Jerry Meyer at <*Jerry.Meyer@us.army.mil*>)

Personnel

As most of you know, we have consolidated the military occupational specialties (MOSs) 21J, 21F, and 21E into MOS 21E (commonly known as "Super Echo"). Training for this MOS is underway and going very well.

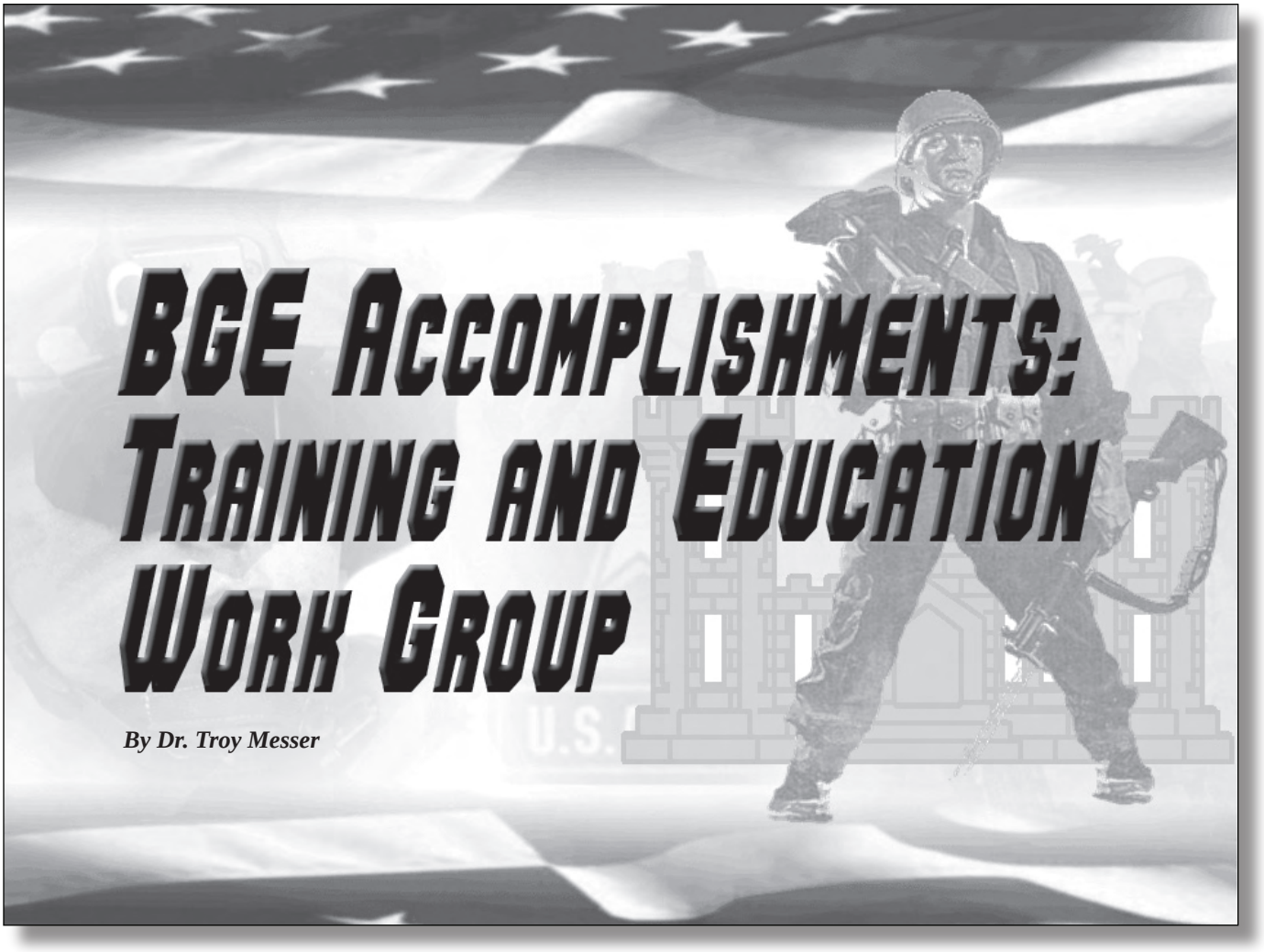
We are also working on an overarching strategy for our military working dog handlers. We are working with MANSCEN, the United States Army Military Police School, and the United States Air Force (the executive agent for military working dogs) and have proposed a comprehensive solution to consolidate all dog handlers into a single MOS called 31K. This recommendation is just one of several that were the result of a Vice Chief of Staff of the Army (VCSA)-directed review of military working dogs. With a dedicated MOS, Soldiers will be able to serve as dog handlers throughout their career (rather than just for an assignment) and in a career in which they will handle several different types of military working dogs. New organizations and new equipment are also part of the study recommendations. There are many advantages to this, but some of our Soldiers are concerned that they might have to become military police if they want to continue to work with dogs. It's too soon to know all the answers, but the plan is that engineers would not be moved out of an engineer MOS unless they requested to do so. Also, any solution will not change the relationship of engineers to mine dogs or special search dogs; these capabilities will remain available to the Regiment. Once we have an Army-approved decision, we will share the full details of this with the field.

The Engineer Personnel Proponency Office (EPPO) has been working with the geospatial, Department of the Army, and intelligence communities to have all 21Y (geospatial engineer) positions coded for Top Secret clearance. If you have 21Ys in your units, go ahead and submit them for Top Secret clearances now.

We just recently staffed the update of Department of the Army Pamphlet 600-3, *Commissioned Officer Professional Development and Career Management*, and the redefining of critical jobs for our engineer leaders. The old term of *branch qualification* has been replaced by the terms *key* and *key development jobs*. The new pamphlet also introduces the new term of *developmental or broadening assignments*, which will carry added emphasis and importance to our officer and

(Continued on page 19)

Medium Mine-Protected Vehicle (MMPV)



BGE Accomplishments: Training and Education Work Group

By Dr. Troy Messer

The United States Army Engineer School, Directorate of Training and Leader Development (DOTLD) and Department of Instruction (DOI) are leaning hard into the flywheel. Here at the School, the DOTLD team is employing and empowering the right people to develop and deliver *Building Great Engineers* (BGE) initiatives. Recent actions include expanding the engineering body of knowledge with academia and partners using joint, interagency, intergovernmental, and multinational (JIIM) training events; integrating gaming and technology into the classroom; and expanding leader development and education (LDE) initiatives that include degree program opportunities and joint engineer training partnerships with other Services.

Body of Knowledge

DOI invited Dr. Brock Barry, who will soon be a faculty member of the United States Military Academy (USMA) and Professor in the Department of Mechanical and Civil Engineering, to the Engineer School in February 2009 for an in-depth orientation of the engineer enlisted training program. The briefings highlighted vertical, horizontal, general, and combat engineering at Brown Hall and the Million Dollar Hole training sites. Dr. Barry's expertise in engineering education was turned toward assessing engineer officer education, covering the Basic Officer Leader Course (BOLC) III, the 210A Warrant Officer Basic Course (WOBC), and the Engineer Captains Career Course (ECCC). On the surface, this may not seem to have a high payoff for training and education, but when you consider that Dr. Barry is one of the country's first doctors of philosophy in engineering education, this takes on a whole new meaning. He will serve as a direct link between USMA and the Engineer School in improving the cradle-to-grave education lifecycle of engineers. DOTLD is participating with USMA's Master Teacher Certification program and looking for opportunities to partner with the USMA Engineering Department, starting with Dr. Barry speaking at the 2009 ENFORCE training and education workshop.

JIIM Training Events

We are seeking every opportunity to expand engineer officer curriculums into the JIIM context. Guest speakers from the International Committee of the Red Cross (ICRC), the United States Agency for International Development (USAID), and State Emergency Management Agency provide program overviews to ECCC students in their general engineering module. And recently, selected ECCC small group instructors (SGIs) and ECCC students were given the opportunity to attend the Joint Engineer Operations Course (JEOC).

Mr. Andrew Bell, military delegate of the ICRC, visited Fort Leonard Wood to address the 01-09 ECCC class on

24 February 2009. The subject was the role of nongovernmental organizations (NGOs) in conflict zones. He placed the ICRC in context with the thousands of other NGOs operating worldwide and further defined the mission, objectives, and activities in current conflict locations (such as Iraq, Afghanistan, and the Horn of Africa). His defining the role of ICRC, the American Red Cross, and Red Crescent Societies engendered a high level of interest and interaction from the students.

The ECCC hosted Structural Assessment Visual Evaluation (SAVE) training on 12 February 2009 to increase technical competency and partner with academia (Missouri University of Science and Technology) and federal, state, and local governments. The training, sponsored by the Fort Leonard Wood Chapter, Society of American Military Engineers (SAME), brought the Missouri State Emergency Management Agency (SEMA) SAVE coalition to Fort Leonard Wood. The training taught 64 ECCC students, 2 ECCC cadre, a Directorate of Contracting employee from Fort Leonard Wood, and 6 state and local emergency management personnel in preparation for assessing building structures affected by earthquakes, tornadoes, floods, or natural disasters that cause structural damages for both domestic and theater applications. The student comments were best reflected in this one comment: "It was an awesome experience, and I can speak for many of my peers when I say that the information we've drawn from just this one event will pay huge dividends in our future deployments. The application to our work in Iraq and Afghanistan is obvious. Thanks so much!" All students were offered the opportunity to obtain certification along with their completion-of-training certificate.

DOI is integrating as many curriculum advances as it can. Some of the advances include sending ECCC students and SGIs to JEOC and piloting contracting officer's representative (COR) training and environmental training and education. Two ECCC SGIs and three students will have the opportunity to attend the JEOC hosted at Fort Leonard Wood on 13 – 17 April 2009. The JEOC is just one training opportunity that ECCC and BOLC students can take advantage of if they test out of certain modules in general engineering and basic demolitions.

The United States Army Training and Doctrine Command (TRADOC); Human Resources Command (HRC); and the Department of the Army Operations and Plans (G3), Civil Affairs (G5), and Information Operations Staff Officer (G7) approved DOI to pilot three days of COR training for the ECCC, Engineer BOLC, WOBC, 21H Basic Noncommissioned Officer Course (BNCOC) and Advanced Noncommissioned Officer Course (ANCOC), and 21N BNCOC and ANCOC. The 20 hours include the minimum essential training requirement to become a COR according to the Federal Acquisition Regulation (FAR) and TRADOC Regulation 5-14, *Acquisition Management and Oversight*, dated January 2009. DOI has trained a total of 328 students since June 2008 (86 BOLC, 35 WOBC, 204 ECCC, 57 21H BNCOC and ANCOC, and 11 21N ANCOC students) in the following subject areas (located at <*http://www.atrrs.army.mil/channels/aitas*>):

- CLC 106 – Contracting Officer Representative With a Mission Focus (minimum 8-hour requirement)
- CLC 011 – Contracting for the Rest of Us
- CLM 024 – Contracting Overview
- CLM 003 – Ethics Training for Acquisition, Technology, and Logistics (AT&L) Workforce

DOI and the Directorate of Environmental Integration (DEI), in response to surveys of 125 ECCC students and field commander comments, assessed environmental compliance in the curriculums. As a result of the assessment, DOI and DEI are partnering to gain approval for a pilot, three days of environmental training and education for the Engineer BOLC and four days for the ECCC and WOBC. In order for U.S. troops to be out of Iraq by 2012, Multinational Corps–Iraq (MNC–I) C7 (senior staff engineer in Iraq) indicates this training gap must be addressed. Current environmental understanding needed to support the Army Force Generation (ARFORGEN) process is inadequate. The pilots will address training and education in designing, building, and maintaining solid waste and wastewater systems and conducting environmental baseline surveys.

Gaming and Technology

Gaming and technology in the classroom are becoming the new enablers to overcome instructor personnel shortages and the constraint to grow engineer courses. DOI has implemented several new technology initiatives in the following BOLC areas:

- General Engineering Division – Use of the Turning Point Classroom Response System (CRS)
- Combat Engineering Division – DARWARS Ambush! and Virtual Battle Space 2 (VBS2)™ Route Clearance Gaming Software
- Officer Training Development Division (OTDD) – Implementing Gameshow Pro for classroom learning

DOTLD is also seeking funding for laptop computers in the classroom. The integration of these technologies will create challenging student-centered learning and collaboration. Current technology trends in civilian and military academia, such as USMA, Fort Knox Armor School Maneuver Captains Career Course, Armor BOLC, and Virginia Technical College of Engineering have all adopted the same or equal classroom technologies (to include laptops) as learning multipliers, a best practice by any standard.

Degree Program Opportunities

Currently the Engineer School participates with several universities with branches at Fort Leonard Wood to provide cooperative credit, master's degree programs such as engineering management, civil engineering, geological engineering, and public and business administration.

From 1995 until the present, 427 students have graduated with a degree in engineering management, 319 in civil engineering, and 189 in geological engineering. Currently, 15 students are enrolled in a degree program in engineering management, 1 in civil engineering, and 29 in geological engineering. While the opportunity is now only provided to ECCC graduates, Engineer School cadre and the Fort Leonard Wood Noncommissioned Officer (NCO) Academy are forming an exploration committee to conduct a limited pilot of this program with NCOs and junior officers (BOLC, WOES, 21B BNCOC and ANCOC, 21H BNCOC and ANCOC, and 21N BNCOC and ANCOC graduates).

Joint Engineer Training Partnerships

DOI is actively collaborating with the Air Force Institute of Technology (AFIT) to conduct a pilot exchange of program material and course seats. It has been discussed as an initial way ahead that two to five ECCC students each quarter could attend AFIT's WMGT 585, Contingency Engineer Command Course, depending on AFIT course fill, and continue to discuss the possibility of seats in WMGT 570, Civil Engineer Superintendent Course, and WMGT 436, Operations Course, in order to gain a joint context between the two Service engineer schools. Additionally, DOI would provide Army engineer lesson(s) at a 101 level to various AFIT leader courses focusing on types of operations orders, fragmentary orders, and warning orders; mobility; countermobility; assured mobility; and counterinsurgency. This partnership would allow AFIT to attend video teleconferences (VTCs) to gain awareness of current Army engineer theater operation events through monthly and quarterly secure VTCs, such as Multinational Coalition Forces–Iraq, Fusion Cell, Worldwide Engineer VTC, and the Engineer Training Support Network (ETSN).

Summary

DOI, in support of the *Building Great Engineers* Campaign Plan, is making deliberate and positive progress. We continue to engage in new initiatives such as the body of knowledge, technology in the classrooms, and JIIM partnerships. We encourage positive and negative constructive feedback from the field so that we can gauge our true progress.

Dr. Messer is the technical director of the Department of Instruction, Directorate of Training and Leader Development, United States Army Engineer School. He retired from the Army in May 2001 as a sergeant first class after serving four stateside tours, three overseas tours, and one combat tour in Panama during Operation Just Cause. He is an Army Civilian Education System advance graduate.

("DOTMLPF," continued from page 16)

warrant officer career tracks. The Regiment is now at a crossroads, and we need to decide whether to manage officers with a single career track as we do now or go back to some kind of multiple tracking system like the 21A, B, and D series we had several years ago. We will develop courses of action at the Engineer School and rely on feedback from the field in order to get this important decision right. (POCs: Lieutenant Colonel Keith Dupont at <*keith.dupont@us.army.mil*> and Colonel Joe Cepeda at <*Jose.Cepeda@us.army.mil*>)

Facilities

We are working a number of local issues here at the Engineer School (such as the Prime Power School move to Fort Leonard Wood and new facilities for training the JAB and the assault breacher vehicle (ABV), but most of these will be invisible to the field. The real emphasis here over the next few years will be getting our units aligned for training. The United States Army Forces Command (FORSCOM) engineers are managing this for the Army, but the ultimate goal is to get our units colocated with maneuver units whenever the opportunity exists. Also, in May-June of this year, the Engineer School headquarters will move into improved office space on the first floor and will have a dedicated Engineer School entrance.

Another aspect of facilities that I will highlight is the Basecamp Integrated Capabilities Development Team (ICDT) that is being conducted at the MANSCEN level. While we have a lot of experience and expertise on basecamps, there is still no overarching doctrine that covers construction, operation, and closing of basecamps. MANSCEN is working to gain this proponency and the resources required to execute this mission for the Army. (POC: Mr. Steve Orth at <*Steven.Orth@us.army.mil*>)

Summary

As you can see from these highlights, this is an exciting time for the Regiment, and we have numerous actions underway that will shape the branch for many years to come. Feedback from the field is always appreciated. Please feel free to contact me or any of the points of contact previously listed if you are interested in knowing more details on these actions or if you have ideas to submit. Thanks in advance for your comments and thanks to the entire Regiment for the outstanding jobs that are being executed every day across the full spectrum of operations.

Colonel Rowan (Retired) is the Deputy Assistant Commandant, United States Army Engineer School. Previously, he served as the Assistant Technical Director for Military Engineering at the United States Army Engineer Research and Development Center (ERDC), Vicksburg, Mississippi. Other key duty positions include Commander, ERDC; Commander, 1st Engineer Brigade; Commander, 54th Engineer Battalion; and Commander, 16th Engineer Battalion. He has served in Operation Iraqi Freedom both as a military officer and a civilian.

Officer Professional Development in a BGE World

By Lieutenant Colonel Scott C. Johnson

Over the last three to four years, our Engineer Regiment's force structure reemerged in the form of the Future Engineer Force. This engineer force included a much larger ratio of combat capability to construction or technical capability than it did in the recent past. These units need leaders and Soldiers with more technical engineering skills and abilities, and the need for these skills and abilities goes beyond the more technically oriented units.

With the February 2008 revision of Field Manual (FM) 3.0, *Operations*—and through personal experience, officially published lessons learned, and feedback from peers and superiors—there is a consensus that United States Army engineers at every level, from brigade combat team (BCT) platoon leaders to staff officers, need to improve their general engineering technical skills to better support full spectrum operations. In a nutshell, this is the central theme of the *Building Great Engineers* (BGE) Campaign Plan.

How We Got Here

Whether they admit it or not, over the years many of our fellow engineer officers have had a maneuver fetish, real or impressed upon them by the maneuver-centric environment in which they found themselves. The focus on maneuver shaped the Engineer Regiment's doctrine, organization, training, materiel, leadership and education, personnel and facilities (DOTMLPF) decisions and focus over the 15 to 20 years before 11 September 2001. The maneuver mentality was in direct response to the Army's focus on training for direct combat versus a more holistic approach to warfare that emerged with the version of FM 3.0 published in June 2001.

The direct combat focus enabled and enhanced the Army's ability to synchronize combat operations, which in turn facilitated successful (albeit limited) operations that culminated in the initial operational success in Iraq. Operation Desert Storm fits into this context due to the limited time frame and objectives of that action. Force-on-force operations during rotations at the United States Army combat training centers were the culminating point of combined arms training for BCTs.

Similarly, direct engagement-focused computer simulation exercises at the division and corps levels almost never transitioned beyond the *fight* and barely touched on the next phase. In reality, the brigade, division, and corps exercises rarely incorporated the detailed planning and execution requirements of large-unit deployments and sustainment, or the enormous tasks associated with building the infrastructure that supports our forces. These exercises did little to prepare the Army for the realities of repairing a defeated nation—helping to provide essential services, security, economic recovery, or capacity-building.

To maintain relevance in a direct combat-centric environment, engineers focused on the mission at hand—combined arms offensive and defensive operations. Critical training on general engineer skills and competency requirements were stripped away from all but construction units, and the construction units on active duty were reduced in number and size. The harsh reality was that these types of units just weren't relevant to the majority of the training being conducted by BCTs, divisions, and corps.

The importance of general engineering missions and unique contributions failed to fully register with the decision makers developing the Army's future force structure. Engineer force structure continued to pay bills for a more maneuver-centric Army with the initial transformation to a more modular force.

The Stryker BCT, in the form of the interim BCT in 2000 and the initial modular BCT-centric designs that emerged in 2003 and 2004, did not appear to recognize the unique contributions of the Engineer Regiment. The experiences of Operation Enduring Freedom and Operation Iraqi Freedom validated the need for a more robust engineer force and a renewed requirement for general engineering skills to support the Army.

The latest revision of FM 3.0 validates these requirements and suggests a requirement for additional modifications to the force structure that will enable the Engineer Regiment to support offensive, defensive, and stability operations or civil support operations equally.

Skills Engineer Leaders Need

While the brief history lesson above is instructive on how the Engineer Regiment was formed, developed, and transformed—and is in the process of transforming again—the Army requires engineer leaders who are able to operate effectively within the engineer force and across the full spectrum of operations. In addition to well-honed tactical skills and acumen, engineers need unique engineer-specific skills to enable the overall success of the operations. The listed tasks and skills are not inclusive, nor are they limited to a single area of full spectrum operations.

Offensive and Defensive Operations

- Analyze and/or shape terrain to maximize the effects of direct and indirect fires in support of a maneuver force or to protect a designated area.

- Analyze, plan, resource, build, maintain, and/or provide lanes in impediments to movement, to include lines of communication through natural and man-made terrain that enable movement in support of operations across the full spectrum of operations.
  - Know and understand maneuver doctrine and how engineers support offensive and defensive missions in urban and restricted terrain.
  - Know and understand Army and enemy mobility/countermobility systems and capabilities and how to maximize their employment or counter their strengths.
  - Know and understand the integration of fires, construction of survivability positions and the synchronization of effects.
  - Know and understand how to enhance mobility by synchronizing effects and/or providing a means to assured mobility in any environment.
  - Know, understand, and be able to execute bridge/gap reconnaissance and develop standard and nonstandard gap crossing and solutions.

Stability Operations or Civil Support Operations

- Design, resource, and build (or have built) force projection structures and life support areas to support our own forces in an austere environment (stability operations or civil support operations).
- Identify, design, resource, and build (or have built) projects that promote economic development and/or restore essential services in a permissive and semipermissive environment.
  - Know and understand Army combatant command and Department of Defense standards and planning factors for force protection and life support requirements.
  - Know and understand how to develop statements of requirements (SOR), statements of work (SOW), and bills of material (BOM) and how to submit projects for contracting, funding, and resourcing.
  - Know and understand the quality assurance (QA)/quality control (QC) process for construction and other engineer-related projects and how to perform as the contracting officer's representative (COR).
  - Have a basic knowledge of essential services and how the systems function and interact.

A strong working knowledge of the stability operations and civil support operations skills listed above is a good basis for the emerging mission of capacity-building with civil authorities and local military forces. Engineer officers must know how to effectively use translators and interpreters, have a basic understanding of the local culture, and know how to engage the media.

Developing, Training, and Enhancing Skills

The tasks and skills listed above provide a framework for developing a personal and professional education program to supplement both a junior officer's college education and the United States Army Engineer School Professional Military Education (PME) program. While the content of the Basic Officer Leader Course (BOLC) III and Captains Career Course (CCC) PME is evolving to meet the demands of the field, the Engineer School has not evolved as an institution to the point where it can produce fully functional engineers capable of executing the wide variety of missions expected of our Engineer Regiment. However, the School continues to adapt. It recently added COR training and just completed its first pilot of Structural Assessment Visual Evaluation (SAVE) training on 12 February 2009.

Now more than ever, a well-thought-out officer professional development (OPD) program and an individual professional development program can significantly enhance the overall professionalism within the Engineer Regiment. Tuition assistance and the ability to coordinate/request training by contractors or through civilian institutions provide a wide range of potential training opportunities on technical topics.

Additional resources and ideas for engineer skills training, although not inclusive, include the following:

Partnering With Installations

- Installation Department of Public Works (DPW) troop construction programs were a major venue for project development and execution for many of our construction engineers. These projects can provide opportunities to train both horizontal and vertical skills, estimating, and QA/QC procedures.
- Most DPWs own and operate the essential services—such as sewer, water, power transmission, gas, and fiber optics—of the installation. With coordination, these systems can become training venues for engineer leaders, either through OPD or on-the-job training (OJT).
- DPWs execute or have oversight over many projects that fall short of the military construction, Army (MCA) threshold. These project sites make great venues for construction OPDs, site visits, and concepts/construction techniques teaching opportunities.
- If additional time is available, units could create intern-style relationships with DPWs that would provide OJT for officers and noncommissioned officers (NCOs) in fields ranging from environmental engineering to civil engineering and from project management to project development (SOR, SOW, and BOM) in support of the range development process or other requirements.

Partnering With Local Governments and Government Agencies

- City, town, and county governments provide services to their citizens and provide a great venue for OPDs on basic

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Show Me the *Building Great Engineers* Money

By Lieutenant Colonel Scott C. Johnson

There are several venues engineer Soldiers can take to obtain certifications and licenses and to get technical-related training. Funding is available now through the tuition assistance (TA) program and through the GI Bill. Units cannot use operations and maintenance funds for individual training and certification, but those funds can be used to pay for mission- or contingency-related technical training for Soldiers.

Programs

There are three programs—Army COOL (Credentialing Opportunities On-Line), DANTES (Defense Activity for Nontraditional Education Support), and AVOTEC (Army Vocational/Technical) Pilot Program—that provide information, training that leads to certification, and/or testing for Soldiers using TA and/or the GI Bill. The licenses available through these programs include engineer, construction, and technical certifications and licenses. Two of the three programs can be used to fund the Professional Engineer (PE) license exam.

Army COOL *(<www.cool.army.mil/>)* provides information and some training resources that can lead to technical credentials. This site focuses on enlisted Soldiers and directly ties unique credentials to specific military occupational specialties (MOSs). Many of these are relevant to engineer commissioned and warrant officers. For example, the 21Z MOS (combat engineer senior sergeant) links to the Certified Associate in Project Management (CAPM) and the Project Management Professional (PMP) credentials. Army COOL also points to training and funding sources such as TA, eArmy U, and the GI Bill. PMP training and testing are available online now through eArmyU.

DANTES *(<http://www.dantes.doded.mil/Dantes_web/certification/Calendar.htm>)* is a Department of Defense (DOD) program that lists multiple credentialing organizations and licenses that can be tested for, or administered through, Army and other Service education centers. Test costs may be covered by TA or the GI Bill and include certificates in building construction, construction materials testing, geotechnical, land management/water control, transportation, and underground utilities construction by the National Institute for Certification Engineering Technology. The Certified Professional Constructor certificate is from the American Institute of Constructors.

Army Vocational/Technical (AVOTEC) Pilot Program

AVOTEC *(<https://www.hrc.army.mil/site/education/index.html>)* is a 2009 Army pilot program funded via TA for credential-producing programs and license and certification examinations. The pilot ends in September 2009, and according to the website, Soldiers must be enrolled in a credential-producing program before that cutoff date. AVOTEC offers online and traditional education programs on a state-by-state basis. Right now there is an online program that leads to certification as a professional home inspector. Traditional certification and licensing programs offered by a local or state institution must be registered with AVOTEC for Soldiers to receive funding. There is an opportunity for each

installation to develop credential-producing relationships with local vocational institutes, community colleges, and other continuing education programs. Additionally, Soldiers can use the AVOTEC system to pay for certification and license examinations by accredited organizations.

TA is available for lifelong learning and continuing education courses in technical-related fields for all Soldiers. The GI Bill will pay for certification and licensing fees and renewals and approved courses leading to the same. Soldiers must be eligible to receive GI Bill benefits. The good news for non-prior service officers is that the GI Bill that kicks off in August 2009 is open to all Soldiers. According to the latest information from the United States Department of Veterans Affairs website, the new GI Bill will pay for one certification test.

Another venue for technical-related training can be pursued via a unit's operations and maintenance funds. These funds can be used to send Soldiers to approved courses such as the United States Army Corps of Engineers Proponent-Sponsored Engineer Corps Training (PROSPECT) program. Unit commanders can also establish Soldier technical skills training courses according to Army Regulation 350-1, *Army Training and Leader Development*, through the Army Education Center via a contractor, although Department of the Army approval may be required if a contractor is used. This type of training could be developed to contribute to the overall body of knowledge required to successfully pass a technical certification or license exam. This technical training could also be tailored as required for contingency missions.

Summary

While the programs and resources described above aren't comprehensive or well-known, they provide a funding source and venue for both technical training and certification for a large proportion of engineer Soldiers. As leaders, we need to know and understand these programs and encourage Soldiers to take advantage of them. Certification, licensing, and the associated training will significantly improve our overall technical competence and capabilities.

Lieutenant Colonel Johnson is the United States Army Engineer School Chief of Staff. He commanded the 1-3 Brigade Special Troops Battalion, 1st Brigade Combat Team, 3d Infantry Division, from 20 June 2006 to 17 June 2008.

("Professional Development," continued from page 21)

services, essential services, emergency services, goverment processes, and a variety of construction projects.

- The local United States Army Corps of Engineers (USACE) district can provide venues for OPDs and MCA/civilian project site visits and intern-style arrangements.
- The Federal Emergency Management Agency (FEMA), Department of Homeland Security (DHS), United States Department of Housing and Urban Development (HUD), American Red Cross, and other agencies and activities may also provide unique opportunities and perspectives on essential services and other technical engineering issues.

Nongovernmental Agencies

- Habitat for Humanity and other charitable organizations routinely have ongoing construction projects where junior leaders can volunteer and obtain direct construction experience.

USACE Proponent-Sponsored Engineer Corps Training (PROSPECT) Program

- In addition to partnering with USACE, technical training is available through the USACE PROSPECT Program. Course offerings can be found in the "Purple Book" catalog at <*http://pdsc.usace.army.mil/* >.
- The Internet also provides an abundance of information on how power generation, water purification, water treatment, road design, QA/QC procedures, and basic horizontal and vertical skills can be brought to bear for OPD or even officer physical training events, to include scavenger hunts, junior officer-led OPDs, and question-and-answer sessions during all-hands events.

Conclusion

The technical training resources and opportunities available to units and individuals are vast. Time, of course, is always an issue, but our Soldiers must balance time available, time between deployments, and family time. It's a challenge, but being able to successfully employ our engineer organizations is also a challenge. Instilling the *Building Great Engineers* ethos for learning our profession is fundamental to our success as engineers.

Leaders throughout the Engineer Regiment must ensure that there is a culture of lifelong learning within our officer and NCO corps that promotes technical as well as tactical proficiency. Fostering a climate that encourages and promotes individual technical and construction-related excellence and discussion is central to developing the adaptive, innovative, and technically competent culture the BGE Campaign Plan envisions.

Lieutenant Colonel Johnson is the United States Army Engineer School Chief of Staff. He commanded the 1-3 Brigade Special Troops Battalion, 1st Brigade Combat Team, 3d Infantry Division, from 20 June 2006 to 17 June 2008.

ENGINEER OFFICER EDUCATION TRANSFORMATION

By Command Sergeant Major Thomas H. Chambers (Retired)

The Engineer Basic Officer Leader Course (BOLC) III has recently undergone several changes, so many officers in the field may be unaware of the specific types of skills and the actual depth of knowledge that graduates of the BOLC III program of instruction possess. This article outlines these changes as well as other proposed changes to the courses.

Why Change?

A number of factors have led to a change of the Engineer BOLC III program of instruction, to include the rewrite of Field Manual (FM) 3.0, *Operations*; the emergence of the *Building Great Engineers* Campaign Plan; lessons learned from Iraq and Afghanistan; and the need to remain relevant. In particular, the increase in technical skills required and the difficulties faced in the contemporary operating environment (COE) need to be incorporated into the course.

During a course review, the BOLC III team recommended changes that field commanders have requested, such as the following:

- Contracting
- DARWARS*
- Supply Management
- Unit Maintenance Management
- Environmental Integration
- Project Management
- Theater Construction Management System (TCMS)

*DARWARS Ambush! is a personal computer-based simulation that provides a flexible training environment for Soldiers to learn important lessons regarding both mounted and dismounted operations in conflict zones such as Iraq and Afghanistan.

Important Changes

Changes in the course's subject material include greater emphasis on project management, contracting, TCMS, urban operations, counterinsurgency, information operations, and cultural awareness. General engineering instruction focuses on base camp design, project management, contracting, force protection, infrastructure reconnaissance, and field force engineering. The use of war games and simulation has increased, and students fight a battle on a combat simulation program and conduct simulated reconnaissance using the RG-31, Husky, and Buffalo simulators.

The recent changes in the course address the gaps in technical skills proficiency. Each leader will receive training on unit supply and unit maintenance operations required of platoon leaders. We have also incorporated aspects of the COE into every scenario, and students encounter a few of the most difficult realities faced daily in operations. Lessons learned from combat are rapidly included in training to ensure the relevance and currency of the subject matter.

In addition, the United States Army Engineer School has implemented a program to require BOLC III leaders to complete a 24-hour block of prerequisite training in response to comments and suggestions from units deployed to theater. The training program will require students to register and complete the following Defense Acquisition University (DAU) online training:

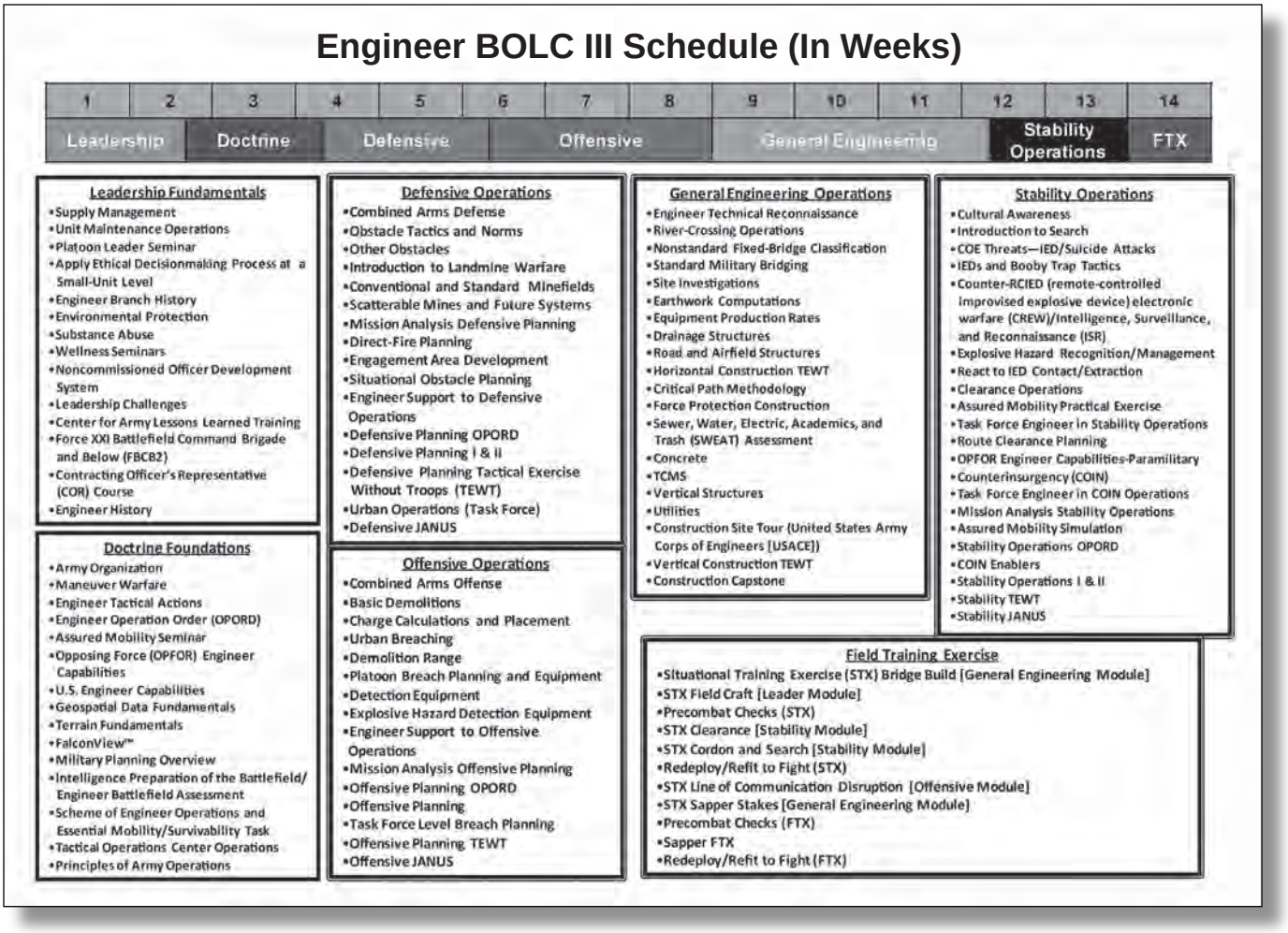
- CLC 106 – Contracting Officer Representative With a Mission Focus
- CLC 011 – Contracting for the Rest of Us
- CLM 024 – Contracting Overview
- CLM 003 – Ethics Training for Acquisition, Technology, and Logistics (AT&L) Workforce

Each module is assigned an outcome that emphasizes the desired end state and provides instructional intent such as the following:

Leadership Fundamentals. Desired outcome: Students will demonstrate a comprehensive understanding of critical engineer training, leader functions, and administrative requirements of a successful platoon leader at the company level.

Doctrine Foundations. Desired outcome: Students will demonstrate a thorough knowledge of engineer doctrine at the company level, including intellectual tools that Army leaders use to solve military problems. Students will also demonstrate a comprehensive understanding of tactics and procedures of the various primary tasks associated with the elements of FM 3-0 full spectrum operations.

Defensive Operations. Desired outcome: Students will demonstrate the ability to employ defensive operations at the company level according to FM 3-0 by integrating a thorough understanding of direct-fire planning, landmine warfare,



engagement area development, obstacle planning, and defensive planning to defeat an enemy attack, gain time, economize forces, and develop conditions favorable for offensive or stability operations.

Offensive Operations. Desired outcome: Students will demonstrate the ability to employ offensive operations at the company level by integrating a thorough understanding of demolitions, breaching, and offensive planning in order to capture the essence of the offensive in engineering operations.

General Engineering Operations. Desired outcome: Students will demonstrate the ability to conduct general engineering operations at the company level according to FM 3-0 by demonstrating a thorough understanding of civil support, restoring essential services, and protecting infrastructure and property according to FM 3-0 by identifying critical aspects of horizontal construction, vertical construction, and bridging operations.

Stability Operations. Desired outcome: Students will demonstrate the ability to employ engineer stability operations at the company level according to FM 3-0 by demonstrating a thorough understanding of counterinsurgency fundamentals and principles, stability operations, COE threats, explosive hazard recognition and management, improvised explosive device (IED) fundamentals, clearance operations, route clearance planning, civil-military operations, negotiations, and search operations.

Field Training Exercise (FTX). Desired outcome: Students will demonstrate the ability to successfully conduct real-time engineer missions at the company level according to FM 3-0 as platoon leaders in a field environment by integrating and reinforcing instruction with tactical mission sets.

Conclusion

The purpose of this article is to keep field commanders informed of the depth and breadth of knowledge that BOLC III graduates possess upon completion of the course. The BOLC III team is working to incorporate many of the suggestions received from the field into the BOLC III program of instruction. Suggestions, lessons learned, and feedback from the field are welcome to ensure that we are providing the Engineer Regiment with the best possible young leaders. Contact the course manager at DSN 581-1310 or by e-mail at <*thomas.chambers1@us.army.mil*>.

Command Sergeant Major Chambers (Retired) is the Engineer BOLC III Course Manager at Fort Leonard Wood, Missouri.

JEOC
Joint Engineer Operations Course

By Mrs. Rachel M. King (formerly Rachel M. Walkenbach) and Mr. Dwayne E. Boeres

The joint engineer community continues to be the tip of the spear for engineering initiatives, and one of its greatest success stories is the Joint Engineer Operations Course (JEOC). This joint engineer opportunity prepares joint staff personnel to respond quickly and adapt effectively to the changing strategic environment. The JEOC is designed to ground students in the responsibilities of a staff officer assigned to the joint engineer staff section of a joint task force (JTF). The major focus of the course is to introduce students to joint doctrine, planning, and operations (specifically engineer operations), and the type of engineer staff positions and associated products engineers are required to develop. Educating and preparing our mid- to senior-level officers, warrant officers, and senior noncommissioned officers (NCOs) for operational assignments in the joint environment, the JEOC operates on the prevailing principle that no engineer should perform a task without first having been educated and trained. This course—which was developed by engineers for engineers—brings together engineers (varying in ranks from E-6/7 to 0-6) from all five Services, government civilians, selected multinationals, and contractors to better prepare engineer operational planners to serve within joint, interagency, intergovernmental, and multinational (JIIM) environments.

Not only will engineers use what they learn in the current operational environment, but they will also use it for future applications to meet the challenges faced by engineer forces of the 21st century. The need for the JEOC is based on guidance from the *National Military Strategy*, the *Quadrennial Defense Review*, and the Chairman of the Joint Chiefs of Staff *CJCS Vision for Joint Officer Development*, as well as other sources. The joint engineer community has set its sights on developing engineers who are better prepared and who can engage and influence engineering factors within the JTF and its combatant commands' areas of responsibility (AORs).

JEOC Dates and Locations

FY 2009 & FY 2010 (Tentative)

The Joint Engineer Operations Course now rotates to four locations each year, providing a course offering at the United States Army Engineer School, Fort Leonard Wood, Missouri; Air Force Institute of Technology (AFIT), Wright Patterson Air Force Base, Ohio; Civil Engineer Corps Officers School (CECOS), Port Hueneme, California; and the Marine Corps University, Headquarters (HQ) Marine Corps, Quantico, Virginia.

13-17 April 2009	3-7 August 2009
12-16 April 2010	26-30 July 2010
Fort Leonard Wood, Missouri	Civil Engineer Corps Officer School
United States Army Engineer School	Port Hueneme, California
	5-9 October 2009
15-19 June 2009	(TBD) October 2010
May 31-4 June 2010	HQ, United States Marine Corps
Air Force Institute of Technology	Marine Corps University
Wright Patterson AFB, Ohio	Quantico, Virginia

Course Description

The JEOC is a blended course consisting of both a distributed learning (dL) Phase and a Resident Phase designed for selected engineer officers, senior NCOs, warrant officers, and government civilians who may serve on a joint staff.

Distributed Learning Phase

The JEOC dL Phase is open to all engineers for self-development in JTF engineer operations. Designed to be about 48 hours, this no-obligation, self-paced, self-development course consists of current information in support of joint engineer operations. From across the Services, engineers from combatant commands, government agencies, and contractors have participated in the development of this course and its resources. Students may elect to complete the JEOC dL Phase only, but the interaction and collaboration with students of other Services at the Resident Phase greatly contribute to the success of JEOC.

The dL Phase consists of eight modules with associated lessons that introduce the student to the following:

- Formulating and Integrating United States National Security Strategy
- Joint Operational Planning
- Joint Engineer Service Capabilities: United States Army, United States Navy, United States Marine Corps, United States Air Force, United States Coast Guard
- JTF Engineer Staff Operations and Planning
- Theater Engineer Operations and Base Camp Planning
- Joint Engineer Considerations and Relations with JIIM

- Theater Environmental Considerations
- Resident Phase Preparation Module

Although there is no obligation for completing the dL Phase after enrollment, a dL course certificate (good for one year after completion) is a prerequisite for attending the Resident Phase. An Army Knowledge Online (AKO) or Defense Knowledge Online (DKO) account is required for enrollment.

The dL course enrollment is conducted through e-mail contact with the JEOC Service representatives. (See information at the end of this article.) The Service representative will direct you to the course administrator. For enrollment, you will need to request sponsorship for an AKO account or provide your AKO username information at the time of your request. The administrator will process your enrollment and provide information for access to the JEOC Blackboard site. The dL course is gated and graded and provides a completion certificate (Resident Phase requirement only). The JEOC is not yet an Army Training Requirements and Resources System (ATRRS) integrated course, but course officials are in the process of obtaining United States Joint Forces Command joint certification.

Resident Phase

The JEOC Resident Phase primarily consists of facilitator-led small-group discussions and associated practical exercises (PEs). Integrated throughout the course agenda are thirteen JTF engineer seminar discussions via video teleconference (VTC), guest speaker or panel discussions, and social networking activities with guests from specialized engineering fields. The thirteen seminars are aligned with PEs built around likely JTF scenarios. Students must demonstrate their knowledge and ability to apply joint Service engineer capabilities, common functions, and responsibilities of a JTF engineer staff officer or NCO in a simulated JTF engineer staff environment to develop a joint engineer solution. The small-group discussion topics and PEs are as follows:

- Service Engineer Capabilities
- Engineer Support Plan
- JTF Assignments, Functions, and Roles
- Horizontal Staff Integration
- Engineer Functions
- Facilities Engineering and General Engineering
- Outside-the-Wire JIIM Considerations

Resident Phase seminar briefing and discussion topics are as follows:

- Combatant Command Engineer–AOR Briefing
- Theater JTF Engineer Perspectives and Lessons Learned
- Coalition Engineer Panel (A, B, C Countries)
- JTF Engineer Observations and the Effects-Based Approach to Operations
- Senior Engineer (Joint Staff J4) Theater and Joint Engineer Considerations
- Sourcing and the Request-for-Forces (RFF) Process
- Base Development and Planning
- Environmental Considerations for the JTF Engineer
- Senior Engineer Brief (Service Engineer Chief)
- Engineer Support to JIIM Operations
- Contractors on the Battlefield Panel Seminar and Dinner
- Defense Support to Civil Authorities (United States Northern Command)

Enrollment in the Resident Phase of JEOC requires completion of the dL Phase of the course and a contact request to the Service representative or to the course administrator. Requests for Resident Phase attendance should be made 120 days in advance. Because course quotas fill quickly, consider enrollment as early as possible; seats can be held up to a year in advance. Each course offering supports 60 students. Top priority goes to personnel assigned to a JTF, combatant command, or component command. Second priority goes to personnel with a high probability of being assigned to a joint billet. Third priority is for other personnel who would benefit from attending JEOC.

Summary

The JEOC is a Joint Staff J4 initiative directed through the Joint Operational Engineer Board (JOEB), and the course and the course management team are hosted by the United States Army Engineer School at Fort Leonard Wood, Missouri. The joint engineer community is working to finalize the JEOC as a joint, permanently funded and established functional course by FY2010. This course has graduated 324 engineers from all five Services who are now better prepared for the evolution of the joint warfighter.

Engineer staffs and planners are encouraged to enroll in the Joint Engineer Operations Course! This course provides sufficient grounding for students to understand the responsibilities of a staff officer assigned to the joint engineer staff section of a JTF. The major focus of the course is to introduce students to joint doctrine, planning and operations (specifically engineer operations), and the types of engineer staff positions and associated products engineers are required to develop. For information pertaining to enrollment, contact the course administrator, Mr. Dwayne Boeres, at the Engineer School's Directorate of Training and Leader Development. He can be reached at <*dwayne.boeres@us.army.mil*> or (573) 563-7065.

Mrs. King is the JEOC Course Manager. She is a former Army officer and has worked the development and execution of the JEOC for five years. She is a contractor with C2 Technologies, Inc.

Mr. Boeres is the JEOC Course Administrator. He retired from the Army Engineer Corps in 2006 and has served on the JEOC team for three years.

Advanced Route Clearance Courses: Getting There . . .

By Major Carl Coats and Mr. Larry D. Jackson

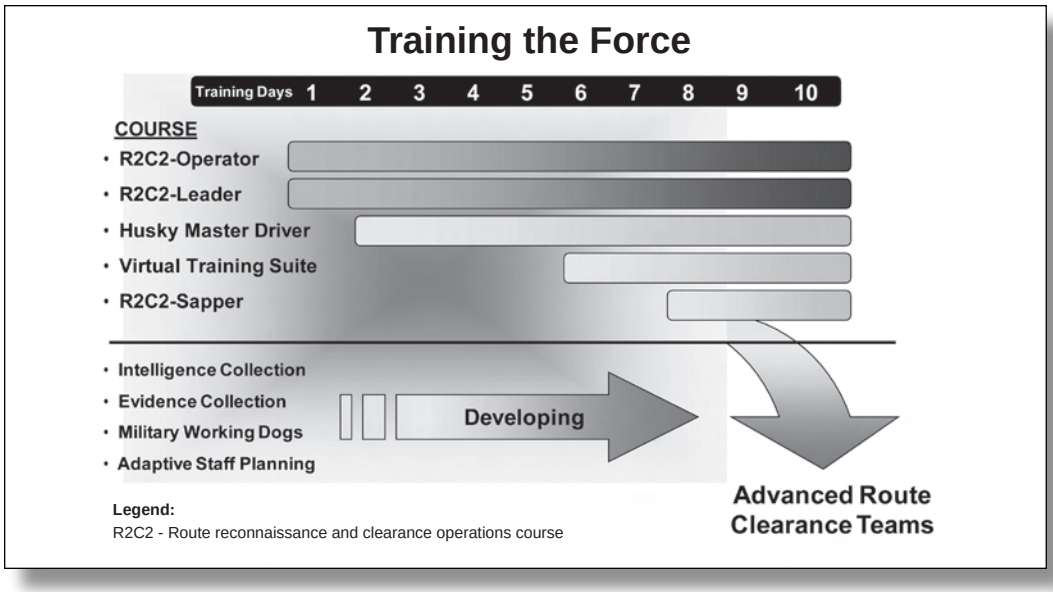
Is the training at the Counter Explosive Hazards Center (CEHC), Fort Leonard Wood, Missouri, individual or collective training? Is it doctrine? Or is it tactics, techniques, and procedures (TTP)? These are questions repeatedly asked about the courses taught at the CEHC. Very much like the battlefields that our Soldiers fight on in the 21st century, the answer is not simple. That is even more true for a center that attempts to teach relevant contingency training that accurately reflects the contemporary operating environment (COE). This article will explain the current suite of route clearance courses taught by the CEHC and highlight some of the future initiatives that are in the pipeline.

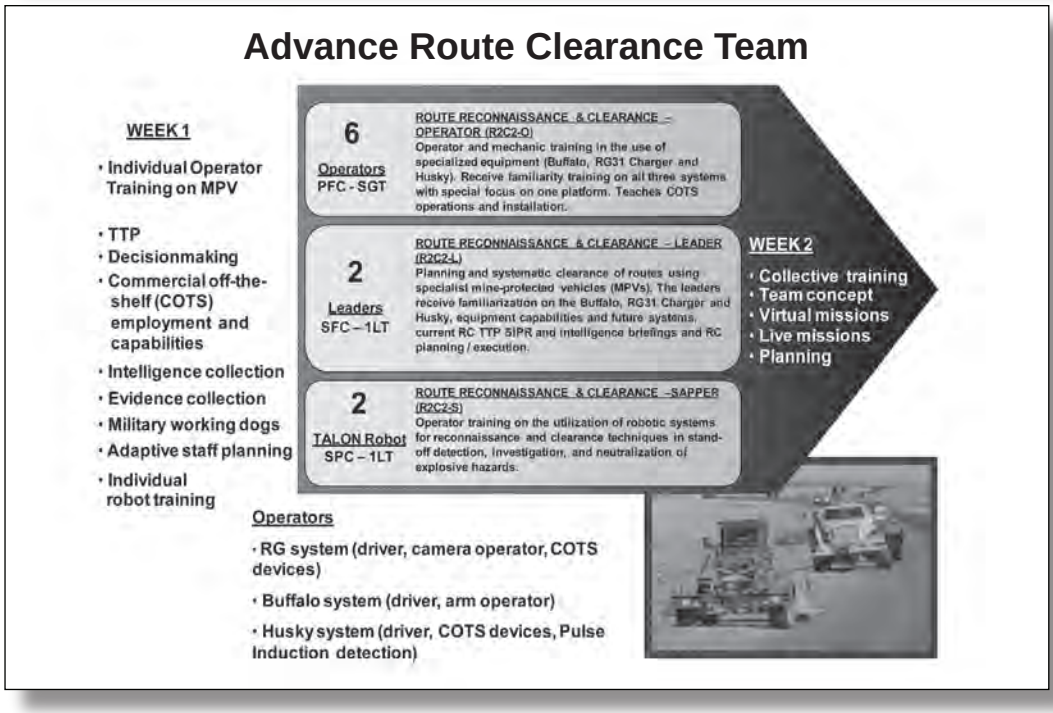
Suite of Courses

Route clearance is a mounted operation carried out by Soldiers in a variety of heavily armored vehicles. Its main purpose is to patrol designated routes to give the area commander a high level of assurance that the route is safe for civilian and military vehicular traffic. On today's battlefield, this translates to finding and clearing the route of obstacles—including improvised explosive devices (IEDs)—to enable assured mobility.

The Operator, Leader, and Sapper Courses form the suite of route clearance courses taught at the CEHC. Initially, these were taught as individual courses, with the onus on home stations and the collective training centers to carry out collective training and bring together the various capabilities. However, with a higher operational tempo and reduced dwell times, there isn't time for commanders to follow the traditional cycle of training individually, then collectively, at platoon, company, and battalion levels. This caused the CEHC to examine its courses and make changes to assist commanders in the predeployment training of their Soldiers.

A Soldier prepares an explosive charge to place on a robot to blow an IED in place.





Analysis of information from both current operational theaters and a series of interviews with deployed and redeploying units revealed that the members of route clearance patrols, although individually well-trained, sometimes struggled to receive an appropriate amount of home station and collective training. This resulted in Soldiers who were competent in their own responsibilities, but struggled to understand the capabilities of the other members of the patrol. The decision was made to combine the three courses to allow cross-pollination of training. This combined training approach to route clearance is not collective training, but an introduction to the host of capabilities present at the patrol level. This is advantageous for the Soldiers, since they are introduced at an early stage to the capabilities of their battle buddies. It is crucial for commanders, since they get an opportunity to plan a route clearance patrol, issue orders, and "deploy" their Soldiers to carry out a mission as a formed team.

Operator Course. This training is aimed at Soldiers in ranks from privates to sergeants and focuses on detecting, investigating, marking, reporting, and neutralizing explosive hazards using the Buffalo, Husky, and RG-31 Charger mine-resistant, ambush-protected (MRAP) vehicles. In order to gain an in-depth knowledge of how to operate and drive the Husky simultaneously, the Husky students are separated during the first week. The remaining students focus on the other two vehicles, learning to drive and operate the equipment to the required standard.

Leader Course. This training is aimed at Soldiers in the rank of sergeant first class to first lieutenant. It focuses on the planning and command and control (C2) of a patrol. Students

A Husky (front) and an RG-31 set off on a route clearance patrol.

learn to conduct a threat assessment of the battlefield; mission-planning, orders and rehearsals; and execution of realistic missions.

Sapper Course. This course includes Soldiers in the ranks of specialist to first lieutenant. Students learn to operate the TALON® robot, allowing them to identify explosive hazards and understand the threat they pose. Their training then guides them through a series of questions that allows them to assess whether or not they can neutralize the hazard without requesting assistance.

Each of the three courses lasts 80 hours over a two-week residential period at Fort Leonard Wood. During the first week, the three courses run simultaneously, but with a degree of separation. This allows students to concentrate on their particular responsibilities and become proficient in their own disciplines. The second week brings together the operators and leaders to allow commanders to plan and execute a mission with their own Soldiers. The Virtual Training Suite is also introduced during this period to let commanders and leaders practice their own platoon-level TTP and C2. The ability to rerun missions in the virtual environment gives commanders the opportunity to mission-rehearse their Soldiers until they all understand what to do in different circumstances. During this phase, Soldiers conduct "real" missions on the equipment, giving them an opportunity to hone their personal operator and driver skills, while simultaneously giving commanders a chance to plan and execute a mission with the Soldiers they will deploy with. The Sappers are then introduced, giving the route clearance patrol the ability to deal with explosive hazards with the vehicles and remotely, from a standoff distance, using robots.

Possible Future Improvements

Combining these three courses allows commanders to improve predeployment training by giving their platoons an opportunity to practice individual and platoon-level skills in the training environment. The COE is ever-changing, with the enemy adapting daily to our TTP. Likewise, the CEHC has also adapted to attempt to close the gap between our training and the actions of our enemies. As such, the new training will not remain static. Plans are in the pipeline to introduce dog handlers to the courses to give commanders that extra ability to confirm or deny the presence of an explosive hazard.

The need for an evidence collection capability to "fight the network" has also been highlighted, and the feasibility of introducing this to one of the courses is under study. The development of commanders and leaders cannot be ignored either. Today's battlefield requires adaptive thinkers who are not merely trained in TTP, but who are educated. Commanders and leaders are required who think like the enemy, who remain unpredictable and who constantly change how they reflect the COE. These are all future aspirations to maintain constant upgrading so that courses at the CEHC remain relevant to our operational theaters.

Major Coats was commissioned into the Royal Engineers from the Royal Military Academy Sandhurst in 1999. He commanded at Troop level in Northern Ireland and England before taking up the post of Regimental Intelligence Officer and subsequently a Squadron Second-in-Command post in Germany. Following two tours of Iraq, he was promoted to Major, attended the Intermediate Command and Staff College, then took up the post of Chief Future Plans at the Counter Explosive Hazards Center, Fort Leonard Wood, Missouri.

Mr. Jackson enlisted in the Georgia National Guard as a combat engineer in 1975. After completing his basic and advanced individual training at Fort Leonard Wood, he enlisted in the Regular Army. Over a 30-year career, he served in leadership positions ranging from team leader to command sergeant major. He now serves as Chief, Training Support Division at the Counter Explosive Hazards Center.

IED Defeat Gated Training Strategy

A Holistic Approach to Preparing Units and Soldiers for Combat

By Colonel Kenneth J. Crawford

Warfighters and leaders across the United States Army often face the same challenge as they create and execute their directed mission-essential task list (DMETL) training. Once they receive orders for deployment, their interests quickly adjust to their future operating environment and the threats therein. The most common and lethal threat experienced on today's battlefield is the improvised explosive device (IED).

Of the 4,865 fallen warriors in Operation Iraqi Freedom and Operation Enduring Freedom,[1] 3,830[2] are a result of hostile action, and 2,350—or 61.4 percent—are the direct result of an IED.[3] Thousands more have been wounded by the devices. These deadly IEDs consist of various types and configurations of explosives, munitions, triggers, and arming and firing methods. However, there is one constant element—it took an enemy to design, finance, manufacture, transport, emplace, arm, and (sometimes) detonate an extremely lethal device against our fellow warriors. The purpose of this article is to furnish leaders and resource providers with a holistic and practical approach to prepare and train Soldiers and units for combat. Specifically, it is meant to provide a methodical approach along the three lines of operation laid out by the Joint IED Defeat Organization (JIEDDO),[4] which calls for—

- Defeating the device.
- Attacking the network.
- Training the force.

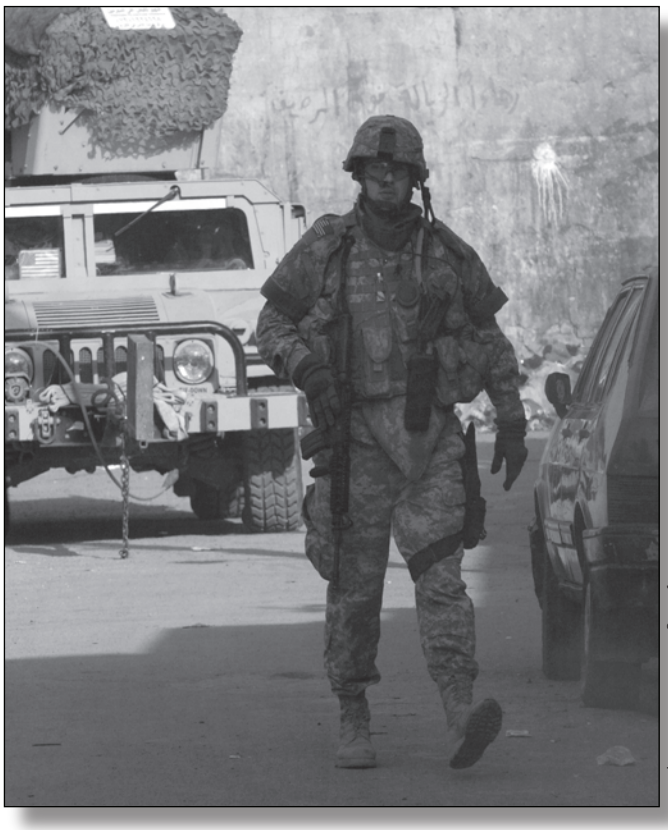


Photo by Sergeant First Class Kap Kim

IED defeat skills are important for Soldiers whether mounted or on foot.

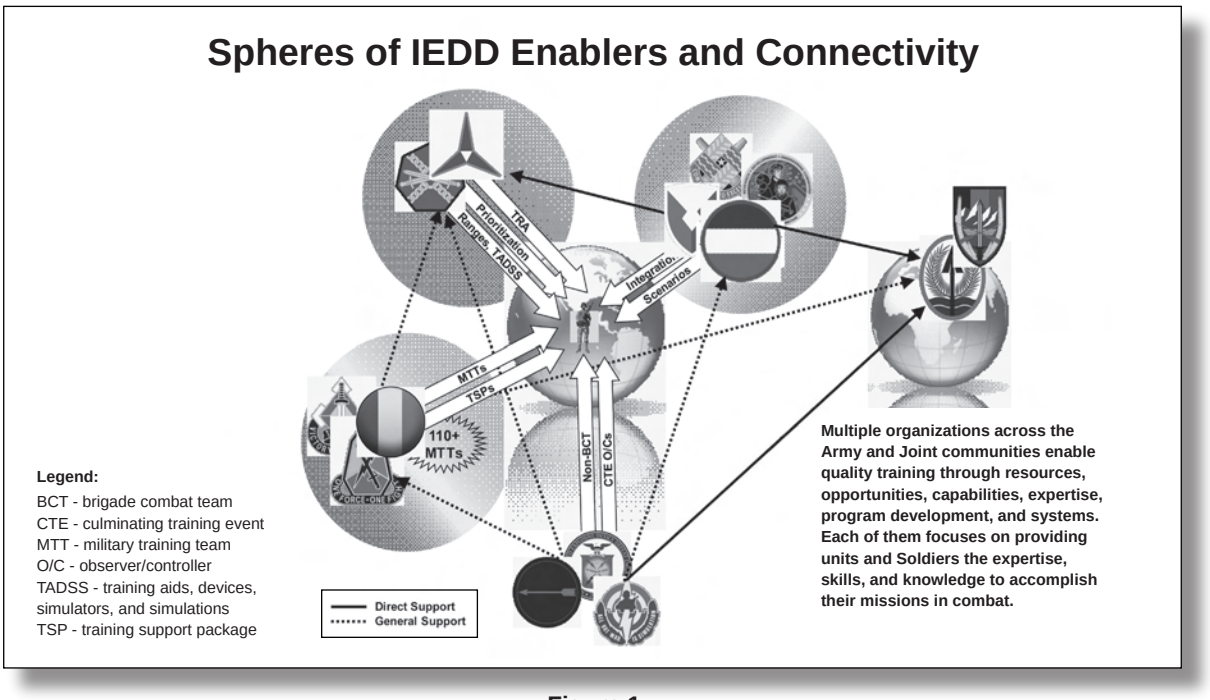


Figure 1

The readily available and supporting Joint Center of Excellence at Fort Irwin, California, supports training warfighters by "validating and propagating IED defeat (IEDD) tactics, using [tactics,] techniques and procedures (TTP) and lessons learned from theater."[5] The primary outlet for this expertise is found in our combat training centers (CTCs), which provide units with a wealth of experience and resources in a hyper-realistic training environment. The challenge is providing this quality of training experience across the Army for all deploying forces at home and mobilization stations for all Regular Army and Reserve Component forces.

Providing Quality Training

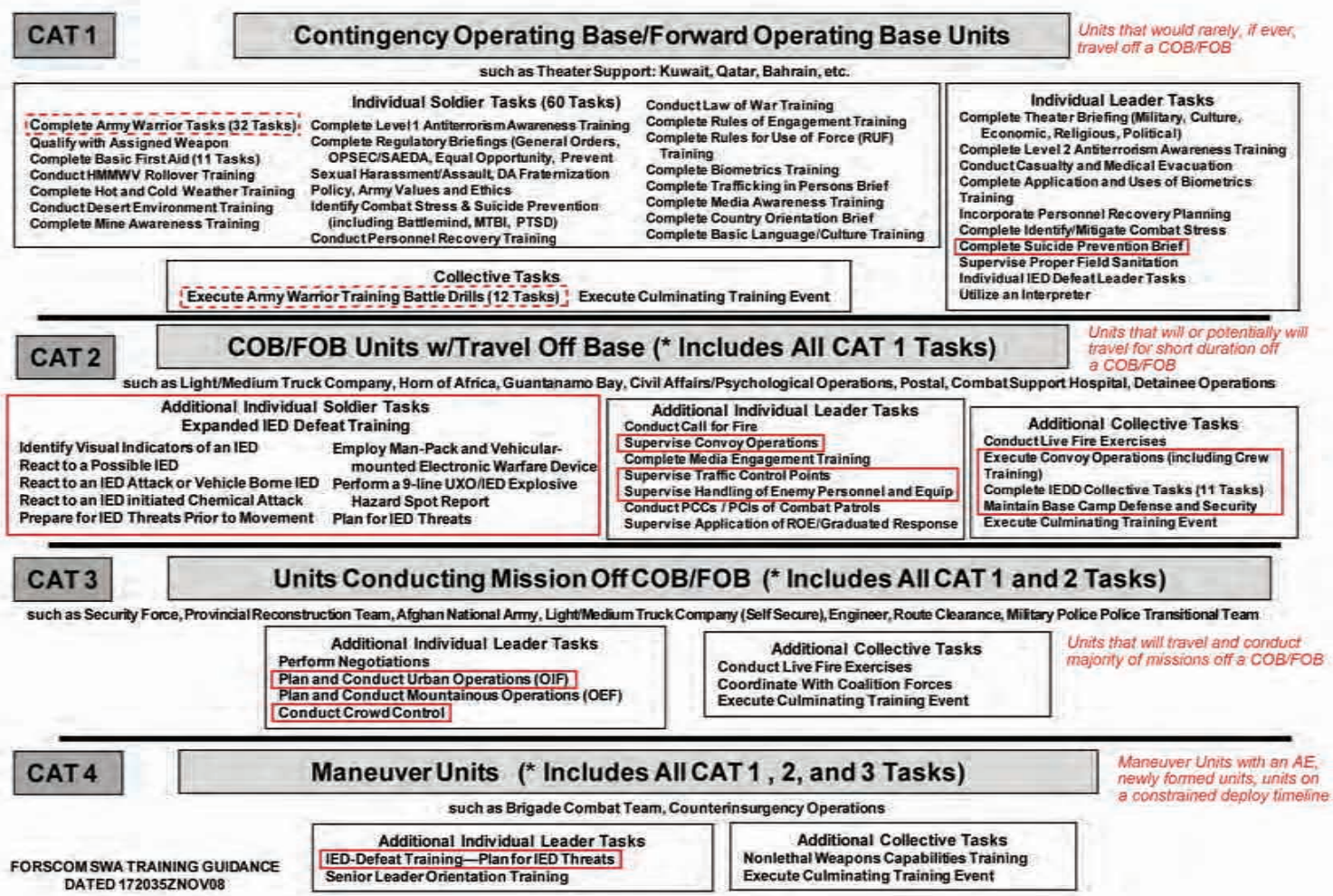
A systematic approach to providing Soldiers and units with the quality of training they deserve is to harness the resources of our installations—facilities; ranges; training aids, devices, simulators, and simulations [TADSS]—and the expertise of specific organizations such as JIED-DO, the Asymmetric Warfare Group (AWG), the United States Army Training and Doctrine Command's IEDD Integrated Capabilities Development Team, and Forces Command's IEDD Integration Cells. These are used in a gated training strategy (GTS) similar to the one used to conduct Bradley Fighting Vehicle and tank gunnery tables. (See Figure 1 for the interrelated resource providers for home station training.) The solution isn't simple and will require vigilance to maintain relevance as our tactical environments and enemy TTP change. Every unit leader's intent is to develop and resource the training that will best prepare their Soldiers for what they may experience downrange. Rather than complicating resource requirements, the IEDD community must enable the chain of command, which has the ultimate responsibility (inherent within senior commanders' training and readiness authority [TRA]) for preparing Soldiers and units for deployment. The cascading complexity of efficiently coordinating the resources for a senior commander requires a dedicated and focused effort to provide support to all units training at home station. Essentially, this is commanders' business and commanders must have the ability to use resources to meet their common challenge, which is the absence of a standard, relevant, and current approach to training IEDD at the individual through collective levels.

Structuring and Planning the GTS

Structuring a way to overcome this challenge through live, virtual, and constructive (LVC) training to produce a CTC-like experience at home station lets leaders and units hone their skills, battle drills, and TTP before certification and deployment. In essence, the leaders and units will arrive at the CTC or their deployed destination with heightened levels of competency and ability. The GTS is not a catchall approach for training on all predeployment tasks, but focuses on IEDD and its supporting or interrelated tactical tasks. Given the high probability that IEDs will remain a weapon of choice for our enemies in future conflicts, our IEDD training must be adaptive, structured, and holistic.

Soldiers are at risk of encountering IEDs while deployed, and their probability of encountering them depends on their unique operational environment. To effectively synchronize our IEDD GTS, we must prioritize the competing demands for resources and dovetail the hierarchy of training requirements with the training tasks in the four categories articulated in FORSCOM's Southwest Asia (SWA) Training Guidance[6] in November 2008—(see Figure 2, page 33). The GTS focuses the specific individual, leader, and collective IEDD training tasks (outlined in red boxes in Figure 2), builds upon each training experience,

Required Tasks by Deployment Category



Legend:

BCT - brigade combat team
CA - civil affairs
CSH - combat support hospital
DA - Department of the Army
Det Ops- detainee operations
GTMO - Guantanamo Bay
HOA - Horn of Africa
MTBI - mild traumatic brain injury
OEF - Operation Enduring Freedom
OIF - Operation Iraqi Freedom
OPSEC - operations security
PCC - precombat check
PCI - precombat inspection
PSYOP - psychological operations
PTSD - post-traumatic stress disorder
ROE - rules of engagement
SAEDA - subversion and espionage directed against the Army
SECFOR - security force
UXO - unexploded ordnance

Figure 2

and culminates in the unit's ability to systematically defeat the device and attack the network.

The construct of the IEDD GTS takes into account the following considerations:

- It must be scalable to meet the desired training objectives from platoon to brigade level. The strategy must have the ability to be tailored to a unit's mission and experience level. Commanders must tailor the concept to fit current unit training levels, especially for a combat-experienced force; the start point for training may not always be the "crawl" stage. As units head into the next higher level's training event, they must prepare accordingly. As units prepare for major combat operations gunnery, a crew is expected to execute specific tasks before operating as part of a section or platoon; platoons must master specific tasks before executing company-level operations; and companies and battalions must be able to effectively maneuver and mass firepower to support battalion- and brigade-level operations. The nesting of IEDD GTS is similar with the underlying objectives of defeating the device and maneuvering on and attacking the network.
- The training, enemy and friendly TTP, available TADSS, terrain and environment, and systems employed must be relevant and current. We should train with the same systems and platforms Soldiers will operate downrange to reduce the initial risks associated with learning while being engaged. It is absolutely necessary to field our platforms and systems first to those in the fight. To train effectively on similar systems, we can create surrogates and mock-ups to achieve the desired effects until we field the actual systems at our home stations.
- We must ensure that our doctrine and knowledge management remain relevant, current, dynamic, and adaptive to the changing threat abroad. JIEDDO provides outstanding references and resources for LVC training applications through the Knowledge and Information Fusion Exchange (KnIFE). The primary purpose of KnIFE is "to exchange information, consolidate best practices, and respond to requests for information (RFIs) related to the asymmetric application of … (TTP) by both enemy and friendly forces."[7] The KnIFE website provides leaders and units with a wealth of information to enable quality training. Keeping our doctrine current is a significant challenge. Our existing doctrine is a reference that we must expand into our digital knowledge management databases to allow the Army to remain current until the release of the next printed revision. The constantly changing conditions and operating environments mandate a requirement to have both a baseline printed reference and an individual, dynamic online database of information to maintain relevance for the warfighter's training.

We must provide and resource the most realistic training for our Soldiers to immerse them in the environment they'll operate in abroad. The structures, civilians, smells, and sounds experienced by individual Soldiers and units serve to help "inoculate" and prepare them to instinctively respond to conditions they might encounter while deployed.

Photo by Sergeant First Class Kap Kim

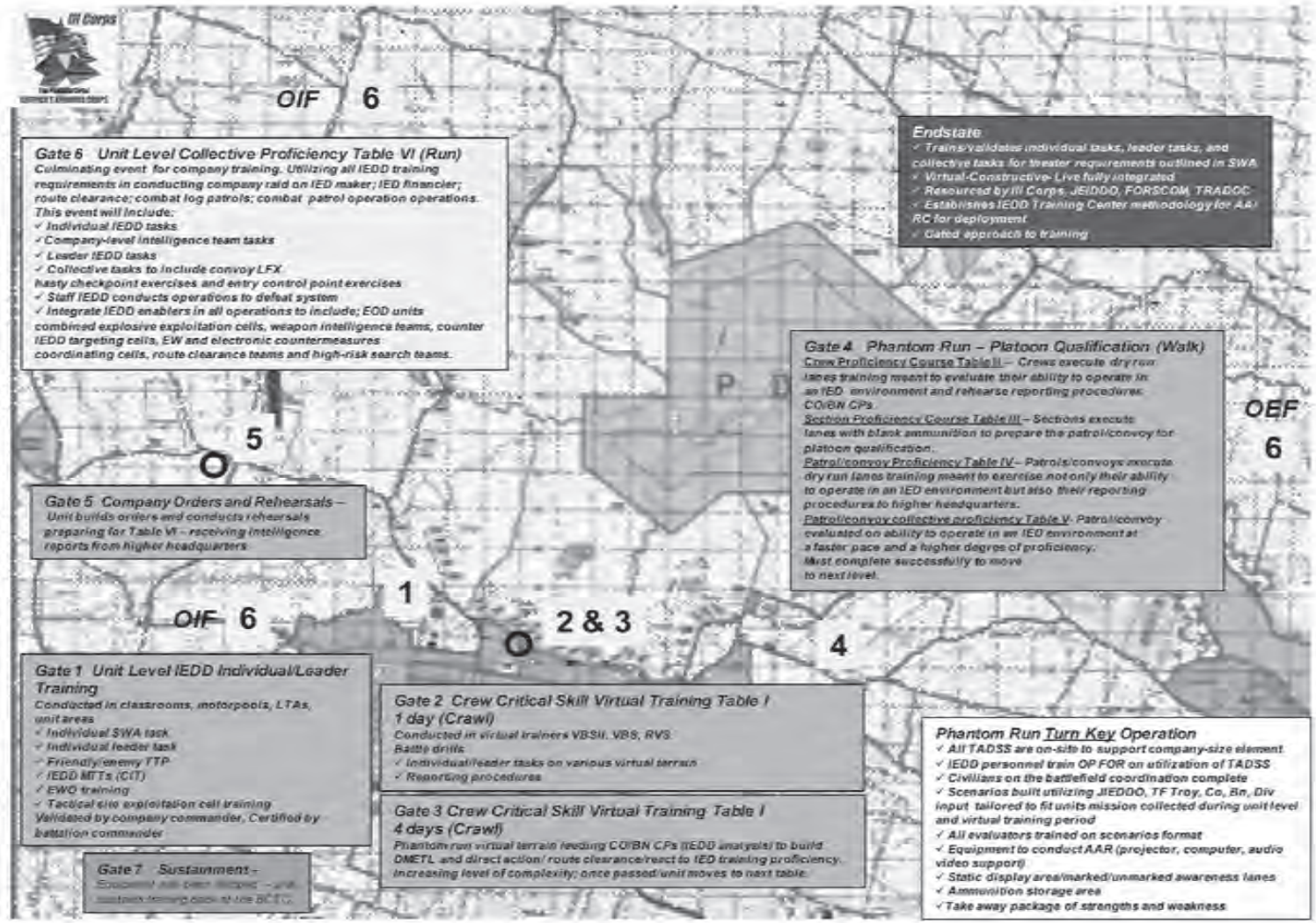
The environments where IEDs are encountered range from rural to inner-city slums. Knowing local residents is just as important as knowing TTP and Army systems.

IEDD "Gunnery"

The IEDD GTS is a holistic approach to training everything from individual Soldiers to brigade-size units to defeat the device and attack the network. The overarching intent is to ensure that units understand and can effectively analyze the complexity of the IEDD fight. The IEDD GTS provides this by creating gates where individuals and units must successfully accomplish specific training objectives to standard before moving to the next higher and more complex gate. The structure of the IEDD GTS includes tables similar to Bradley Fighting Vehicle and tank gunnery tables and is focused on specific unit levels (see Figure 3, page 35).

Gate 1 establishes a baseline to ensure that every individual, crew, and squad can successfully execute the common individual and leader training tasks. It also guarantees that they possess a common frame of reference based on FORSCOM training guidance, doctrine, unit standing operating procedures (SOPs), and current enemy and friendly TTP. KnIFE's training

IEDD Gated Training Strategy Concept
(Live-Virtual-Constructive)



Legend:

BN - battalion
CIT - capabilities integration team
CO - company
CP - command post
EOD - explosive ordnance disposal
EW - electronic warfare
EWO - electronic warfare officer
LTA - local training area
MTT - military training teams
RVS - reconfigurable vehicle simulator
VBSVBSII - Virtual Battle Simulation/Virtual Battle Simulation II

Figure 3

Photo by Colonel Kenneth J. Crawford

As the sun sets over Baghdad, a Buffalo crewmember prepares for a night mission.

resources can enhance unit capabilities when Soldiers attend courses, participate in distance learning, or apply the training support packages available for download. Similar to the gunnery skills tests, commanders certify that individuals and crews are ready to begin the LVC training tables outlined in the IEDD GTS before allowing crews to move into Table I (Crew Skills Virtual Training).

"We must provide and resource the most realistic training for our Soldiers to immerse them in the environment they'll operate in abroad ... and prepare them to instinctively respond to conditions they might encounter while deployed."

Table I

Table I includes *Gate 2* and *Gate 3*, which build on previously gained experiences and knowledge. Unit training is applied and refined through virtual training with simulators and simulations to validate the TTP units will adopt in their SOPs for tactical operations. The focus of Table I is to ensure that crews can effectively perform individual and leader tasks in virtual terrain, provide proper contact reports, and successfully execute crew battle drills, such as rollover drills using the high-mobility, multipurpose wheeled vehicle (HMMWV) egress assistance trainer (HEAT). *Gate 2* is executed in generic virtual terrain and includes graduated skill levels. Once crews successfully meet the standards of performance, they pass into the second half of Table I *(Gate 3)*, which provides a more complex and realistic training experience for the crew and unit. The simulated terrain replicates actual terrain they will encounter in Tables II to V. At this point, the scenario provides a comprehensive experience from the individual crew up to the battalion and brigade commander and staff levels. This takes advantage of the way units manage, report, synthesize, and analyze reports and information for future decisions and action. Every report from Table I to VI (collective proficiency) is meaningful, eventually leading to the ultimate objective of successfully "attacking the network" and ensuring a holistic training experience.

Tables II to V

Platoons normally serve as the lowest level called on to execute patrols in a combat environment. Thus, Tables II to V build to platoon-level proficiency in live scenarios with a crawl-walk-run approach. Crews, sections, and platoons execute their mission and focus on their ability to operate in a combat environment, defeat the effects of IEDs, and submit effective reports as staffs analyze the reports and build actionable intelligence for direct action. Platoon leaders execute one or more missions, similar to what they could experience while deployed. Missions might include—

- Mounted or dismounted navigation.
- Tactical questioning.
- Reaction to contact.
- Establishment of traffic control points.
- Crowd control.
- Detainee operations.
- Other tasks, depending on training objectives selected from FORSCOM training guidance.

The crews, sections, and platoons encounter a hyperrealistic environment while responding to civilian role-players, enemy elements, urban structures, and other battlefield effects that replicate indirect and direct fire, IEDs, and homemade explosives. Once platoons meet the training standards of Table V *(Gate 4)* and the battalion or brigade establishes the IED network hierarchy and probable locations, the company gets orders to prepare to execute lethal operations. Since operations may be led by U.S., combined, or host nation forces, additional complexities and considerations may be included, based on the theater of operations, the established rules of engagement, or the status of forces agreement.

Table VI

Table VI *(Gate 5* and *Gate 6)* focuses on company-level planning, rehearsals, operations, and mission execution. Once all the platoons of a company successfully pass through *Gate 4*, the company receives its mission and begins troop-leading procedures on their forward operating base. On order, the company executes a direct-action mission to destroy or defeat the network by a raid, a cordon-and-search operation, or destruction. Depending on the available training terrain, Table VI could culminate in a combined arms live-fire exercise (LFX) on a multipurpose range complex where battalion and brigades can integrate combat multiplier resources, such as tactical unmanned aerial vehicles (TUAVs), precision fires, or attack aviation.

As units approach their deployment date and ship their equipment, the availability and application of simulations helps them sustain their skill sets and capabilities. *Gate 7* focuses on sustaining these skills and enables the training of Soldiers who arrive after a unit has finished its CTC rotation and shipped its equipment (normally 60 days before the unit's scheduled latest arrival date). These same Soldiers reap the benefits of the unit's training and quickly learn "what right looks like" as they study their unit's TTP and SOPs before deployment.

Figure 3 lays out the IEDD GTS as it is being developed at Fort Hood, Texas. The intent is for all units to have access to world-class home-station IEDD training facilities that enable them to successfully accomplish the desired DMETL tasks and deploy with validated TTP and SOPs. Due to shortened dwell times and the fact that not every type of unit can deploy to a CTC, these resources and training strategy enable units to attain readiness more quickly at their home stations. Additionally, this training can be integrated as part of a battalion or brigade combat team's gunnery scheme of maneuver with minimal effort and resource overhead. The commonality of training tasks and threat allows the Army to adopt the IEDD GTS concept and apply it across every installation for Regular Army and Reserve Component training.

The Desired Effect

The IEDD GTS allows units to build on realistic training scenarios to "defeat the device" as they execute missions and provide reports to battalion and brigade tactical operation centers in virtual and live environments. Staffs synthesize the information gained from the reports into actionable intelligence and build target decks, as well as develop and direct missions, and commanders decide how and when to "attack the network" as they will during deployment. The outcome—or desired training effect—is a unit that is fully trained to operate, adapt, and decisively act in an extremely lethal environment with positive results. Units will deploy well-trained, able to defeat the device, and able to successfully attack the network.

Colonel Crawford is the Assistant Chief of Staff G5 (Plans, Exercises, and Training) at III Corps, Fort Hood, Texas. Earlier assignments include combat tours during Operations Desert Shield and Desert Storm, Operation Continue Hope in Somalia, and two deployments during Operation Iraqi Freedom. He is a selectee for the Senior Service College as a Fellow at the University of Texas Institute of Advanced Technology. He holds a master's in engineering management from the University of Missouri–Rolla (now Missouri University of Science and Technology).

Endnotes

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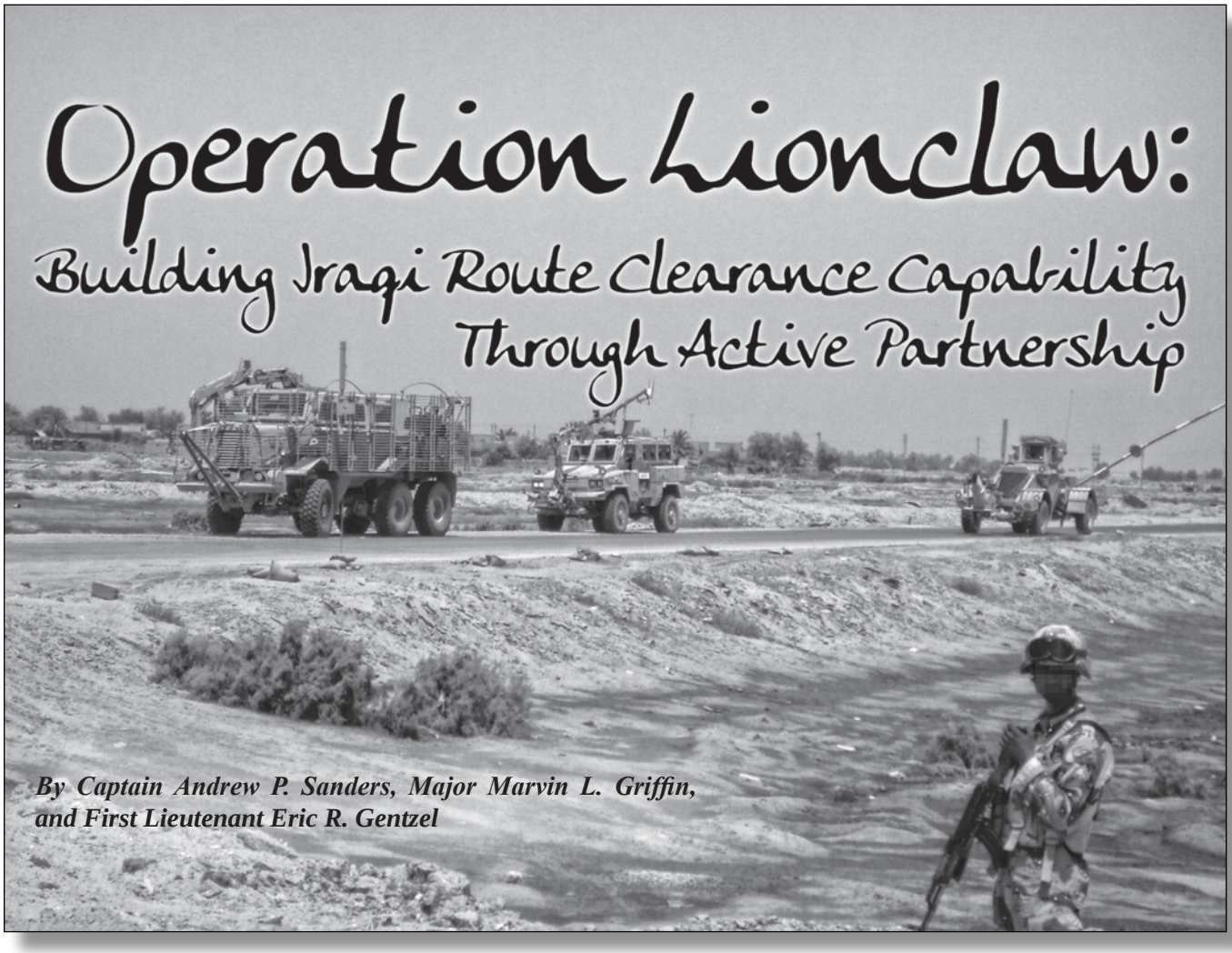
Operation Lionclaw:

Building Iraqi Route Clearance Capability Through Active Partnership



By Captain Andrew P. Sanders, Major Marvin L. Griffin, and First Lieutenant Eric R. Gentzel

During the past several months, U.S. and coalition forces have become increasingly focused on transition. Over time, as U.S. forces draw down in Iraq, the Iraqi Army (IA) will be required to expand its capabilities. For example, the No. 1 threat to both coalition and Iraqi forces continues to be the improvised explosive device (IED), which makes route clearance teams (RCTs) necessary. Since the current Iraqi Army modified table of organization and equipment (MTOE) only authorizes one engineer company for each division, and since a division's operational environment typically covers 5,000 square kilometers in southern Iraq, more Iraqi RCTs will be needed to meet the threat.

Recognizing the capability gap within the Iraqi formation, the 4th Brigade Special Troops Battalion (BSTB), 3d Infantry Division—along with Echo Company, 3-7 Infantry, and the 760th Explosive Ordnance Disposal (EOD) Company—developed Operation Lionclaw to build Iraqi route clearance capability in the 8th Iraqi Army Division by transforming Iraqi infantry platoons into RCTs at the brigade level. The operation was named after the symbol of the Babil Province, the Lion of Babylon, and Iron Claw, the name of many U.S. RCTs. Operation Lionclaw consisted of four critical pieces: manning, equipping, training, and partnering. It would be necessary to successfully complete each of these parts to reach the ultimate goal of independent Iraqi route clearance operations coordinated by the Iraqi brigade.

Manning

The mobility support gap in the Iraqi Army became evident after conducting operations for six months, but we knew we could not build their capability without buy-in from our Iraqi partners. The 4-3 BSTB leader engagement team, in conjunction with the 31st Iraqi Army military transition team, led the discussion with the commander of the 31st Iraqi Army Brigade, who saw the importance of bringing route clearance capability to his brigade and assigned a platoon of Iraqi infantry forces from 2d Battalion, 31st Iraqi Army Brigade, to take the lead in Operation Lionclaw. Three more platoons followed—one each from the 1st, 3d, and 4th Battalions—and were to be handpicked by the battalion commanders of each respective battalion for this critical mission.

Equipping

Another key issue was determining the right equipment set for the Iraqi forces. The standard Iraqi Army route clearance vehicle is the Badger, a version of the mine-resistant, ambush-protected (MRAP) Cougar. With only four of these vehicles available for each Iraqi division, we were forced to develop alternatives. An American route clearance patrol includes a detection element, an interrogation element, and a security element. In a U.S. patrol, the detection element includes the Husky mine detection vehicle and the RG-31 MK III with self-protection adaptive roller kit (SPARK).

The Buffalo mine-protected clearance vehicle conducts interrogation, and the RG-31—or MRAP-type vehicles—provide security (see Figure 1). For the Iraqi Army, we would have to improvise. The initial plan was to use the Polish-built DZIK armored car as the platform for both the detection and interrogation by mounting a blower for detection and a ferret arm for interrogation. We would round out the patrol with an RG-31 with SPARK for detection and an Iraqi M1114 for security.

After an initial engineering and mechanical assessment, we determined that the DZIK would work to mount the blower, and we would mount the ferret arm on the mine roller mount, which our maintenance team designed and fabricated. Once the fabrication was complete, our initial equipment set was complete. The set included the RG-31 with SPARK, RG-31 with ferret arm, and the DZIK or M1114. We were now ready to train the Iraqi Army.

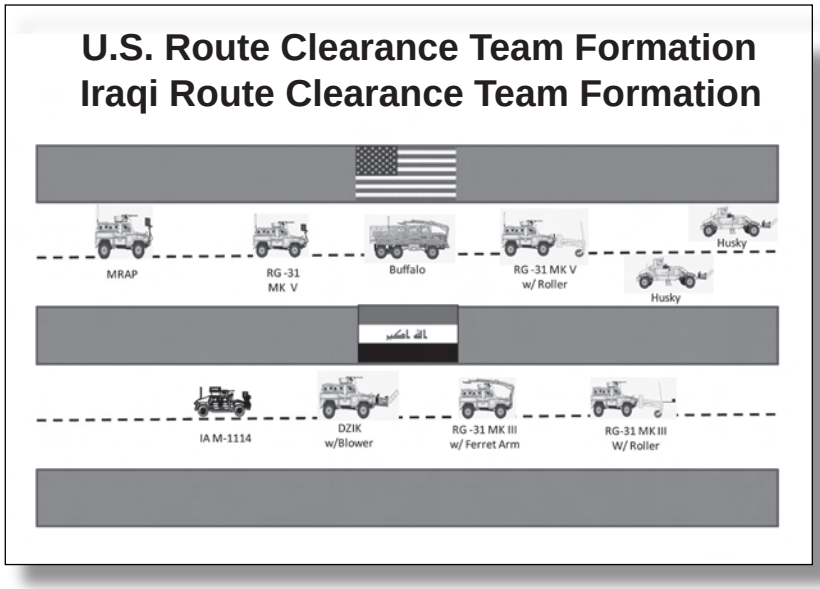


Figure 1

Training

The Lionclaw Academy at Forward Operating Base (FOB) Kalsu served as a 14-day cornerstone training event for the program, where Iraqi forces were trained on critical tasks that would allow them to operate with their U.S. counterparts. A U.S. route clearance platoon leader, enlisted squad leaders, and EOD Soldiers served as cadre. The first week consisted mostly of classroom instruction, in which the students were trained in areas of vehicle maintenance, vehicle recovery, patrolling, and mission briefings. An average day consisted of a classroom portion in the morning, followed by practical exercises in the afternoon.

During the second week of training, the students conducted "mock patrols" on a situational training exercise (STX) lane on the FOB. With help from the EOD Soldiers, the cadre set up inert IEDs and initiation systems common to our operating environment. The students drove the vehicles and operated the equipment themselves, looking for the suspected IEDs. This phase applied the crawl-walk-run method, with coalition forces assisting in the beginning, and ended with the Iraqi platoon conducting a certification STX patrol. Language was a challenge to the training, but with numerous translators assisting, it became easier each day. In addition, the cadre improved their Arabic language skills, enabling them to interact more comfortably with the students.

Partnering

After the first Lionclaw platoon completed the initial 14-day training, we were ready to begin the partnership. Prior to Operation Lionclaw, other coalition units had conducted route clearance training with Iraqis in Baghdad and elsewhere. We took it a step further, including an aggressive partnership program with U.S. route clearance platoons. We were able to draw on other units' experience and programs of instruction as we developed the Lionclaw Academy, but partnership was uncharted territory. The first part of the partnership cycle had the U.S. platoon in the lead and included a leadership ride-along, rehearsals, and integrated patrols with

Iraqi Soldiers conduct a mock patrol in an RG-31 MK III with SPARK.

Iraqi Soldiers train on critical maintenance tasks.

the U.S. platoon (see Figure 2). The second part of the partnership cycle put the Iraqi Army in the lead and included rehearsals and combined patrols with the Iraqi platoon in the lead (see Figure 3). One of the U.S. route clearance platoons was designated the "partnership platoon" so that the operations were consistent and the platoon leadership could develop the personal relationship that is so critical to success in the Arab culture. The partnership expanded to include all platoons in the company as additional Iraqi platoons completed the Lionclaw Academy.

On the first day of the partnership, the Iraqi platoon leader and platoon sergeant conducted a ride-along with the U.S. platoon leader and platoon sergeant in a standard route clearance patrol. After the ride-along, we began work with the rest of the platoon. Some initial challenges were developing command and control tactics, techniques, and procedures (TTP) and combined battle drills. To meet these challenges, we broke the platoon into two sections, with each section conducting two days of instruction on battle drills and mounted rehearsals on the FOB. During the rehearsal days, the U.S. and Iraqi Army chains of command worked out the details of communications between the vehicles. Battle drills trained and rehearsed included IED found, IED interrogation, IED detonation, medical evacuation, and vehicle recovery. Iraqi forces were integrated into the security plan and all aspects of the battle drills.

After the rehearsals were completed on the FOB, the combined patrol was certified to conduct operations off the FOB. Each section conducted three days of combined patrols. The daily schedule included a combined intelligence update, rock drills, patrol briefing, the actual patrol, an after-action review (AAR), and lunch with the U.S. platoon at the mess hall. We started out with lower threat areas along multilane roads to allow the Iraqi Army to continue learning in a live environment. On these patrols, the Iraqi element conducted interrogation of suspected IEDs and served as part of the cordon during interrogation. After each mission, we conducted a combined AAR to glean the lessons for the day's operation and fine-tune command and control of the formation. After a week of combined patrolling by section, the conditions were set for the Iraqi Army to take the lead in partnership.

Iraqi-led patrolling began with rehearsals to refine TTPs and adjust the patrol to the new formation with the Iraqi platoon in the lead. With their proficiency proven in previous combined patrols, only one day of rehearsals was necessary. After final refinements and communications were set up, the patrols were ready to execute. As before, the patrols started off on a multilane highway with limited traffic, which allowed the Iraqis to navigate easily and focus more on the basics of route

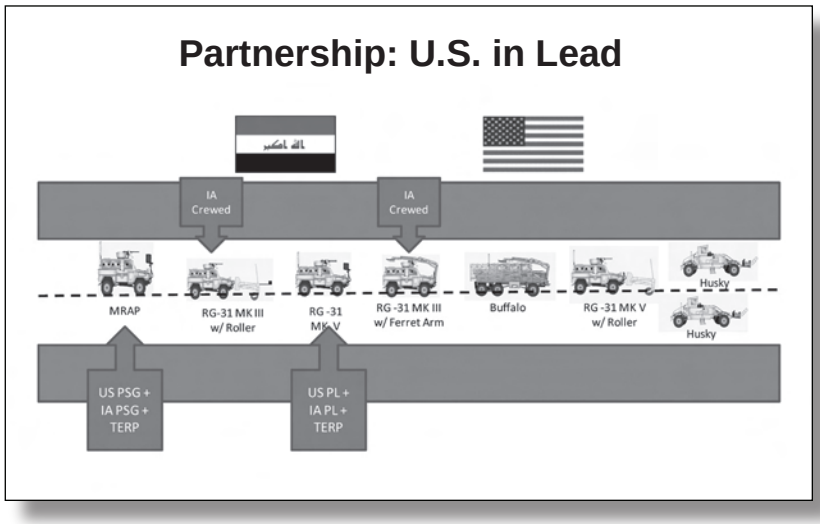


Figure 2

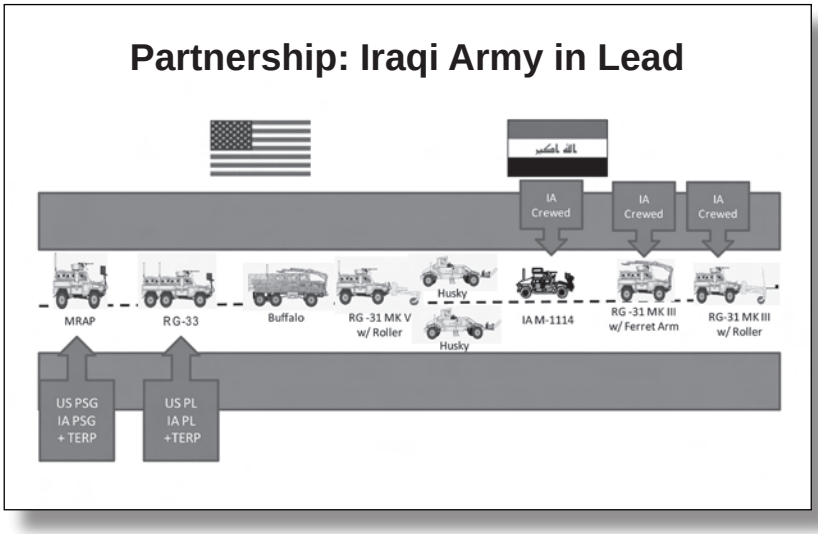


Figure 3

clearance rather than being concerned with civilian traffic in built-up areas. The Iraqi platoon leader was partnered with the U.S. platoon leader and rode in his vehicle. From here, the Iraqi platoon leader was able to both command and control his formation and coordinate with the U.S. patrol via the interpreter over the vehicle's internal AN/VIC-3 communications system. The Iraqi patrol's frequency was loaded on the second radio set, so the Iraqi platoon leader was able to use the AN/VIC-3 for both internal and external communications. This setup streamlined command and control of the patrol and allowed direct contact between the two patrol leaders.

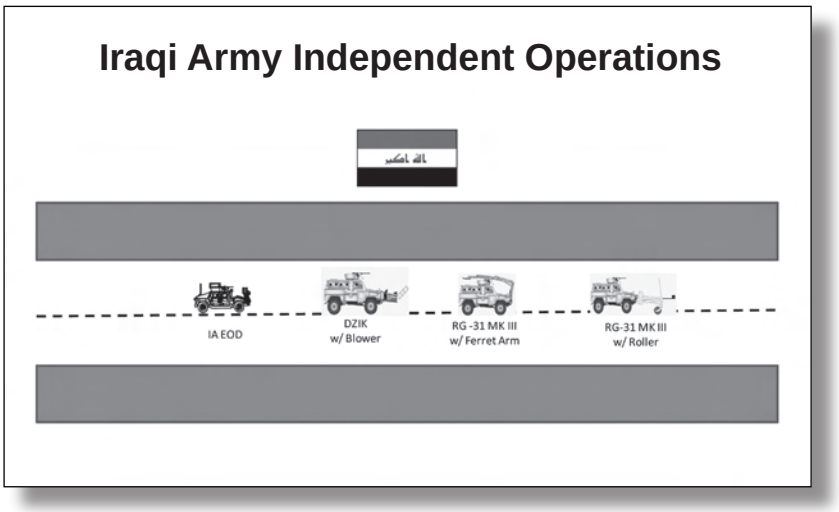


Figure 4

The platoons conducted five days of combined patrols with the Iraqi Army in the lead. These patrols progressed from relatively simple routes on a multilane highway to more difficult terrain. The "capstone" patrol was an Iraqi-led patrol through the congested towns of Haswah and Iskandariyah. The Iraqi Army's navigation and command and control skills were put to the test as they maneuvered through the challenging urban terrain.

Conclusion

Operation Lionclaw has been successful in building Iraqi Army capability, enabling combined operations and building the relationship between the Iraqi and the U.S. Armies. However, the Iraqi platoons cannot conduct independent operations until they are properly equipped. The ultimate goal for equipping would be one RG-31 MK III with the ferret arm, one with the SPARK, and one Iraqi DZIK or M1114 as a security vehicle (see Figure 4). The current challenge is that the RG-31 MK IIIs are still U.S. Army property and cannot be transferred to the Iraqi Army for independent use. Until the equipment can be transferred, or the Iraqi Ministry of Defense buys more sets of route clearance equipment, route clearance at the Iraqi Army battalion and brigade levels will be limited to combined patrols with U.S. platoons.

U.S. Soldiers lead a combined patrol brief.

Captain Sanders is the commander of Echo Company, 3-7 Infantry, deployed in support of Operation Iraqi Freedom. Previous assignments include sapper platoon leader, construction support platoon leader, and company executive officer with the 14th Engineer Battalion; assistant training and operations officer (S3) for reconstruction and assistant S3 plans with the 4th BSTB, 3d Infantry Division. He holds a bachelor's in civil engineering from the United States Military Academy and is an intern engineer in the state of New York. He is a graduate of the Sapper Leader Course and Airborne School.

Major Griffin is the executive officer of the 4th BSTB, 3d Infantry Division. Previous assignments include platoon leader, company executive officer, and assistant S3 with the 326th Engineer Battalion, 101st Airborne Division (Air Assault); assistant S3 and company commander with the 40th Engineer Battalion, 2d Brigade Combat Team, 1st Armored Division; and instructor/assistant professor in the Department of Civil and Mechanical Engineering at the United States Military Academy. He holds a bachelor's from the United States Military Academy and a master's in civil engineering from Georgia Institute of Technology and is a licensed professional engineer in the state of Missouri. He is a graduate of the Engineer Officer Advanced Course; Combined Arms Services and Staff School; Command and General Staff College; and Airborne, Air Assault, and Ranger Schools.

First Lieutenant Gentzel is the lead advisor/officer in charge for the Lionclaw Academy and is the support platoon leader in HHC, 4-3 BSTB, conducting EOD security missions in support of Operation Iraqi Freedom. As platoon leader for E/3-7 Infantry Battalion, he conducted route clearance operations in and around the Babil Province of Iraq from November 2007 to May 2008. Commissioned from the Officer Candidate School at Fort Benning, Georgia, he holds a bachelor's in telecommunications management from Ohio University.

The 766th Explosive Hazards Coordination Cell Leads the Way Into Afghanistan

By First Lieutenant Matthew D. Brady

On today's resource-constrained, high-turnover, asymmetric battlefield, assessing the threats and developing appropriate courses of action can present leaders with complex choices requiring analysis of second- and third-order effects. In a legacy battlefield like that in Afghanistan, threat analysis can become complicated due to the presence of explosive hazard remnants from decades of conflict. To synchronize the combat power and resources dedicated to reducing those hazards, a common operating picture is needed. The explosive hazards coordination cell (EHCC) helps develop the common operating picture and provides informational or situational understanding on explosive hazards to coalition forces to minimize coalition and civilian casualties.

New Type of Engineer Organization

The first EHCC to be deployed to Afghanistan in support of Operation Enduring Freedom was the 766th EHCC, Illinois Army National Guard. Its mission was to provide situational awareness on explosive hazards to coalition

Terrain such as this narrow pass in Afghanistan can limit the mobility of route clearance packages.

Many roads in Afghanistan are simply cut into the side of a mountain and may not bear the weight of heavy route clearance vehicles.

forces, the International Security Assistance Force (ISAF), and nongovernmental organizations to support stability operations in Afghanistan. The cell's Soldiers provided trend and pattern analysis, focusing on elements directly involved in the removal or reduction of explosive hazards. In addition, they observed, collected, wrote, published, and distributed route clearance information.

The EHCC is a new type of engineer organization that was first employed during Operation Iraqi Freedom. At its beginning in spring 2003, the EHCC was known as the Mine and Explosive Ordnance Information Coordination Cell (MEOICC). In its early days, it merged portions of a Mine Information Coordination Cell (MICC)—which tracked explosive hazards to coordinate safe military movement in mined areas and supported force protection through hazard awareness training—and a National Mine Action Authority (NMAA), which coordinates Mine Action Center (MAC) operations in regions where humanitarian demining operations are active. Since fall 2005, the organization has been known as the EHCC, and to date there have been four so-named rotations through Iraq. The EHCC in Afghanistan was first employed in spring 2008. In the past, EHCCs had been formed from elements of engineer battalion headquarters support companies. Doctrinal EHCCs began to be stood up in 2008 and will continue into 2011.

766th EHCC Partners

The 766th EHCC partnered with many organizations during its mission in Afghanistan. As an organic part of Combined Task Force (CTF) Castle, the EHCC supported Task Force (TF) Workhorse (Route Clearance) and TF Hammer (Construction) by providing them with explosive hazards awareness. Along with components of CTF Castle, the EHCC collaborated with the Combined Information Data Network Exchange (CIDNE); BuckEye, an airborne high-resolution geospatial collection system; Joint Task Force (JTF) Paladin, the counter improvised explosive device (C-IED) task force for Afghanistan; the MAC; and the Counter Explosive Hazards Center (CEHC) at the United States Army Engineer School, Fort Leonard Wood, Missouri.

TF Workhorse

Everything the EHCC produced was primarily focused on supporting TF Workhorse, which had the route clearance mission for Regional Command–East and portions of Regional Command–South. TF Workhorse led the way on route clearance operations all across Regional Command–East and proved to be a dominant player in the IED fight, involved in more than one-third of all IED events in its area. It excelled in adapting quickly to the ever-changing threat presented by the IED fight. Not only did the Soldiers incorporate the new technologies that were constantly offered to them, they came up with innovative ways to push their equipment to the limit—and sometimes beyond the original design concept.

Combined Information Data Network Exchange

The EHCC collaborated with CIDNE to improve the quality of reporting and helped to educate people on the importance of timely, accurate reporting. CIDNE is the database of record and provides users with the tools to support the diverse and complex processes contributing to the mission of coalition forces. It provides an information bridge between various communities which, while working the same problem sets from different perspectives, might not otherwise be able to share data. The Web-enabled Temporal Analysis System (WebTAS) is a flexible suite of generic analytical tools that allows organizations to quickly fuse, visualize, and interpret disparate sources of information, including databases, data streams, and other structured information. WebTAS is designed to help users uncover trends, patterns, and relationships in their data by providing a number of visualization options. Using WebTAS to mine the CIDNE database, the EHCC was able to obtain real-time data on explosive hazard events throughout the theater. This enabled them to create accurate and up-to-date explosive hazard overlays for analysis at both the tactical and operational levels.

BuckEye System Imagery

The EHCC worked with the BuckEye System to provide high-resolution geospatial data coupled with explosive hazard activity overlays so that Soldiers at the tactical level could have better situational awareness of explosive hazard activity in their area of operations. In 2006, the BuckEye System was deployed to Afghanistan to conduct intelligence, surveillance, and reconnaissance missions in support of Operation Enduring Freedom. The BuckEye System's digital color camera was combined with sensor data to collect high-resolution, high-accuracy elevation data. The EHCC used ArcGIS,™ a geospatial analysis program, to fuse the imagery and elevation data, pulled from the CIDNE database using WebTAS, to create a tailored operational picture. This was then used to create Portable Document Format (PDF) files that were small enough to be distributed in locations with limited or restricted bandwidth.

JTF Paladin Liaison Officer

The EHCC embedded a liaison officer with JTF Paladin to facilitate communications among EHCC, CTF Castle, TF Workhorse, Combined Joint Task Force 101, and ISAF soldiers employed in the C-IED fight. The liaison officer brought extensive knowledge of route clearance operations and the ability to navigate through both the CTF Castle and JTF Paladin organizations. This let the liaison officer distribute critical information to U.S. and coalition forces. He established an enhanced working relationship between TF Workhorse, the EHCC, and the JTF Paladin operations research/systems analysis section, science and technology advisors, C-IED Operations Integration Center, and Asymmetric Warfare Group. He also assisted the United States Army Materiel Command by helping coordinate the distribution of several C-IED technologies and initiatives. The liaison officer was able to engage members of ISAF from Regional Commands–East, –West, –North, –South, and –Capital to educate and inform them on what route clearance equipment is in operation by U.S. forces and how the ISAF can use this equipment to perform route clearance missions in their respective areas of operations. Polish, Italian, German, British, Canadian, and French soldiers were all aided by the liaison officer's knowledge of route clearance equipment and operations.

"...assessing the threats and developing appropriate courses of action can present leaders with complex choices..."

Mine Action Center

The EHCC worked with the MAC to coordinate minefield activity near coalition forces. The MAC for Afghanistan coordinates mine action activities in the country and operates under the auspices of the Relief, Recovery and Reconstruction Pillar of the United Nations Assistance Mission to Afghanistan. It is a program of the United Nations Mine Action Service, implemented by the United Nations Office for Project Services. Members of the EHCC staff were also integrated into the MAC itself. They provided geospatial map-making support to document the location of mine areas all across Afghanistan. They also participated in the supervision and quality assurance of the humanitarian demining efforts throughout the Afghanistan theater of operations.

Counter Explosive Hazards Center

The CEHC is the primary training source that the EHCCs use to track and analyze explosive hazards. The CEHC mission is to preserve the fighting force by—

- Providing explosive hazard training to deploying forces.
- Helping to identify and field viable countermeasures solutions and technologies.
- Developing the intellectual and situational superiority of combat units.

The Center provides predeployment training to all units assigned the EHCC mission. During its deployment, the 766th EHCC maintained contact with the CEHC and worked with it to continue to refine doctrinal concepts for both route clearance operations and the EHCC itself.

Mobile Observation Team

The EHCC also employed a mobile observation team (MOT), which conducted ride-along missions with the route clearance packages (RCPs) as specialized observers to collect and document the best practices being used by RCPs and to help distribute those tactics, techniques, and procedures (TTP) across the theater. As the team members moved from one area to another, they brought with them experiences gathered from route clearance missions with other RCPs. This mobility gave them a broader perspective on the C-IED fight than the typical RCP would have. In turn, this allowed the team members to recognize IED threats as they migrated into the areas of operation of different RCPs. As these threats spread across the theater, they could appear to be new techniques when encountered by an RCP for the first time, though the technique could be common in other parts of the theater. When the team members passed through, they helped RCPs counter the new threat by relaying experiences gathered from conducting missions with other units that had encountered the threat before. This allowed RCPs to discover how neighboring units were operating and learn from their collective experiences. Ultimately, this led TF Workhorse to create a strike after-action review to cross-level TTP after each significant activity.

Route Clearance Handbook

The MOT spent most of its time learning from TF Workhorse and bringing those route clearance concepts back to the EHCC for greater distribution. The team's mission culminated in the publication of a route clearance handbook, specific to Operation Enduring Freedom, documenting the successes of TF Workhorse and other RCPs operating in-theater. With the help of the Center for Army Lessons Learned, the EHCC will publish this handbook for widest distribution.

First Lieutenant Brady is scheduled to take command of the 631st Engineer Support Company, 766th Engineer Battalion. Previously an enlisted Soldier, he has served more than 6 years in the Army National Guard. He is a graduate of the Engineer Officer Basic Course and holds a bachelor's in civil engineering and a master's in structural engineering from the University of Illinois at Urbana-Champaign. He also holds a professional engineering license.

Note. The 766th EHCC was formed out of the Headquarters Support Company, 766th Engineer Battalion, Illinois Army National Guard. The EHCC worked closely with the route clearance battalion from TF Workhorse, which was formed from components of the 201st and 206th Engineer Battalions, Kentucky Army National Guard, and the 927th Sapper Company, Louisiana Army National Guard. TF Hammer was formed out of the 62d Engineer Battalion, United States Army, Fort Hood, Texas. The EHCC, TF Workhorse, and TF Hammer operated under the command of the Engineer Brigade, CTF Castle, which was formed out of the Headquarters and Headquarters Company, 420th Engineer Brigade, United States Army Reserve.

Dedication

The following members of the Engineer Regiment have been lost in the War on Terrorism since the last issue of *Engineer.* We dedicate this issue to them.

Connelly, Corporal Brian M.	40th Engineer Battalion, 2d Brigade Combat Team	Baumholder, Germany
Cotting, Private First Class Grant A.	5th Engineer Battalion, 4th Maneuver Enhancement Brigade	Fort Leonard Wood, Missouri
Diamond, Staff Sergeant Sean D.	14th Engineer Battalion, 555th Engineer Brigade	Fort Lewis, Washington
Sam, Staff Sergeant Solomon T.	84th Engineer Battalion, 130th Engineer Brigade	Schofield Barracks, Hawaii
Savage, Sergeant John J.	94th Engineer Battalion, 4th Maneuver Enhancement Brigade	Fort Leonard Wood, Missouri
Turner, Private First Class Ricky L.	3d Brigade Special Troops Battalion, 3d Brigade Combat Team	Fort Bragg, North Carolina

Geospatial Engineering: Combat Development Update

By Mr. Kenneth Bergman

This article provides an update on emerging changes in geospatial engineering and battle command that better enable current and future warfighters in situational understanding and decisionmaking. To this end, the United States Army Training and Doctrine Command (TRADOC) Capability Manager–Geospatial (TCM–Geospatial) completed the Army Geospatial Enterprise functional solutions analysis (FSA) in August 2007. Since then, the TCM–Geospatial and the United States Army Maneuver Support Center (MANSCEN), Fort Leonard Wood, Missouri, have been working with the Army Staff and the United States Army Geospatial Center (AGC) (formerly the Topographic Engineering Center) to implement recommended solutions.

The geospatial enterprise FSA addresses a number of initiatives, one of which deals with organizational changes at the Department of the Army (DA) level to achieve governance across the Army. While the Chief of Engineers continues to serve as the Topographer of the Army, the Director of the AGC has been designated as the Deputy Topographer of the Army and the Army's Geospatial Information Officer (GIO). Mr. Robert Burkhardt, as the AGC Director and GIO, reports directly to the Chief of Engineers on geospatial matters. Mr. Burkhardt has initiated policies to standardize the use of geospatial capabilities in battle command systems. The Geospatial Acquisition Support Directorate (GASD) is a new organization established under the AGC that works across programs of record to establish interoperable geospatial software tools and products based on common standards and interfaces. A new Geospatial Governance Board was established at DA to provide oversight and guidance at the general officer level.

To support these top-level changes, the geospatial engineers are working at all echelons to establish a new concept called the Army Geospatial Enterprise (AGE),[1] where all Soldiers in the field can use various geospatial products and discover and enter geospatial data in an enterprise (distributed) environment. The AGE concept embodies the Army tenet that "every Soldier is a sensor." Soldiers on the ground provide the most accurate input on conditions that update the map foundation for the common operating picture (COP). Geospatial engineer teams will increasingly serve as clearinghouses for data flowing from convoys or patrols, helicopter pilots returning from missions, Soldiers with handheld devices, and other field sources.

The AGE is technically feasible in commercial software, but it has not yet been implemented across systems in the field. Geospatial data handling and management in battle command is currently a disjointed collection of processes and products resulting in multiple pictures with no unified COP.[2] This can be overcome by integrating standardized geographic information system (GIS) technologies across the Army's battle command systems. A GIS uses digital automated tools to manage, edit, and enhance geospatial information to support decisionmaking processes. A GIS can be used to represent the foundational geospatial layers depicted in Figure 1, page 47. Situational awareness information is depicted in the top layer of the figure, in conjunction with the geospatial foundation.

There is increasing recognition of the need for current, accurate GIS capabilities that form the foundation of the COP. This need is being met by organizational and technological changes that will accelerate the insertion of integrated solutions across all Army functional areas. These changes will ensure that our Soldiers receive enhanced geospatial capabilities in their battle command systems.

Under the GIO's direction, the GASD is leading efforts to standardize formats and types of geospatial products that are used in battle command systems. GIS standardization includes the establishment of an Army Geospatial Data Model. The GASD has already established an initial version of a geospatial data model that closely aligns with the National Geospatial–Intelligence Agency (NGA), as well as geospatial standards used by international and commercial communities. Modeling and simulation concepts are also being integrated into the Army Geospatial Data Model. Ongoing model development will lead to a common and interchangeable COP foundation that is built on data models and standards compatible within the Department of Defense (DOD) and with coalition partners.

GASD continues to promote the use of Commercial Joint Mapping Toolkit, where appropriate, across battle command and acquisition community programs of record. NGA oversees the development of the toolkit, including terrain-reasoning software that the AGC has developed. Warfighters have used sand tables for decades to analyze terrain and convey knowledge to others. Today's systems go several steps further by using tools that automate the modified combined obstacle overlay (MCOO). Emerging capabilities from the Battlespace Terrain Reasoning and Awareness program, led by the AGC, will enable Soldiers to use dynamic MCOO-related applications embedded in battle command systems to provide

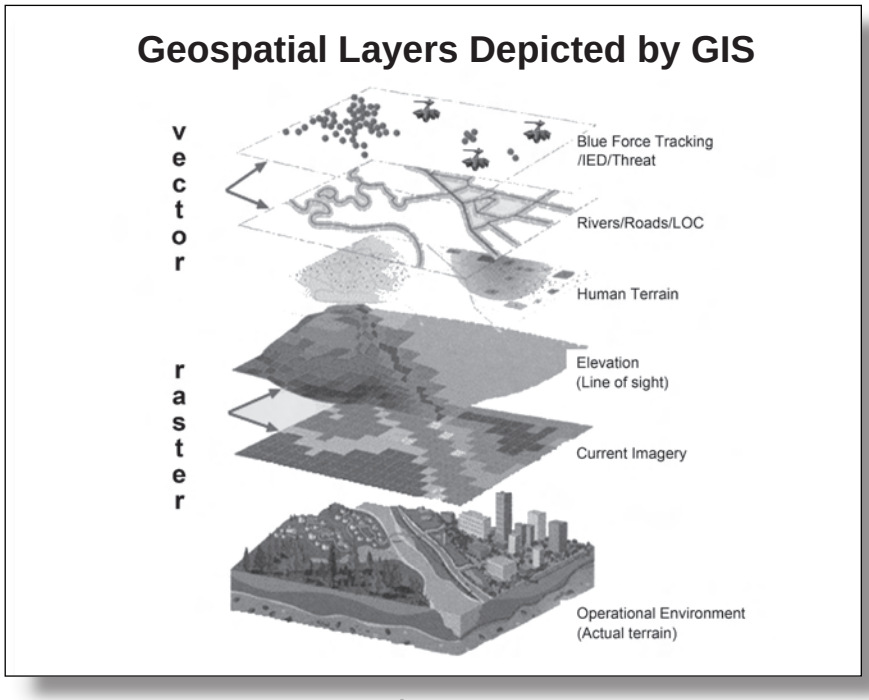


Figure 1

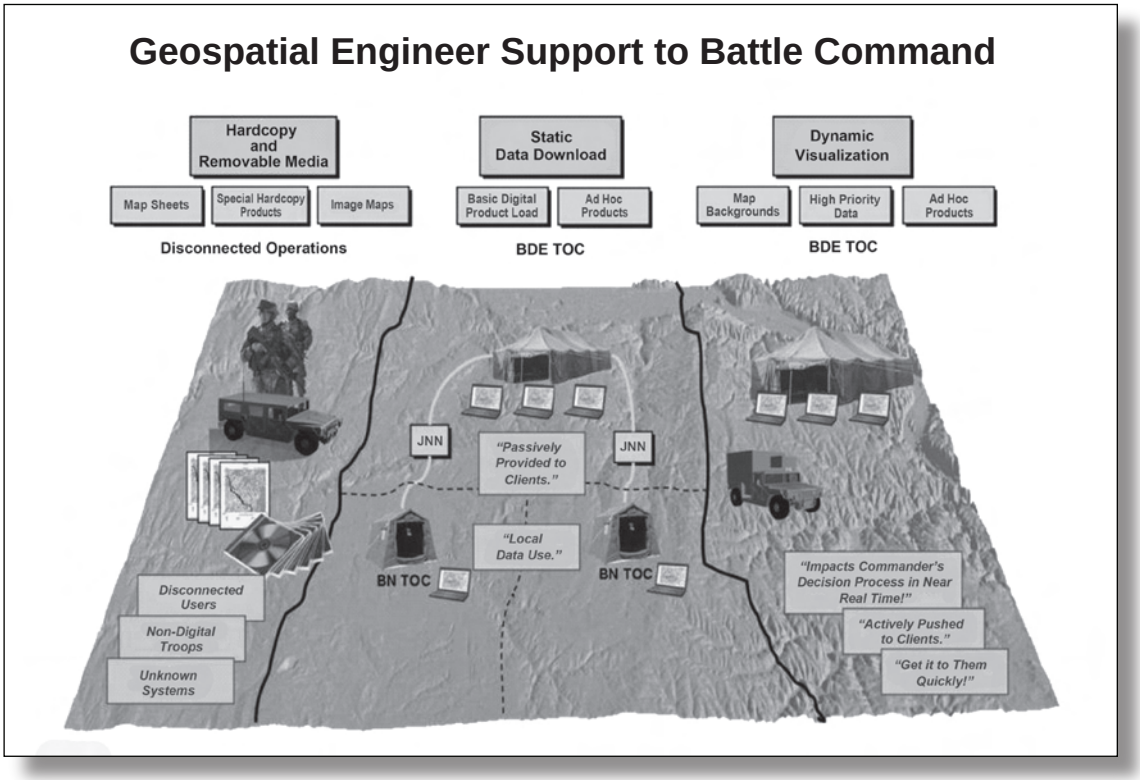


Figure 2

route analysis, line-of-sight analysis, and many other tools. Soldiers at the last tactical mile will be able to tap into terrain-reasoning capabilities at the platform level.

While all of these changes are taking place in battle command system development, the systems used by the geospatial engineer teams are changing as well. Geospatial engineers have used the Digital Topographic Support System (DTSS) for many years to support the military decisionmaking process. DTSS is migrating as the geospatial component of the Distributed Common Ground Station–Army to support integrated intelligence, surveillance, and reconnaissance capabilities. Figure 2 shows the various ways the geospatial engineer teams support battle command.[3]

Knowledge and understanding of geospatial capabilities are essential to providing our forces with the information advantages they need, especially in complex and urban terrain.

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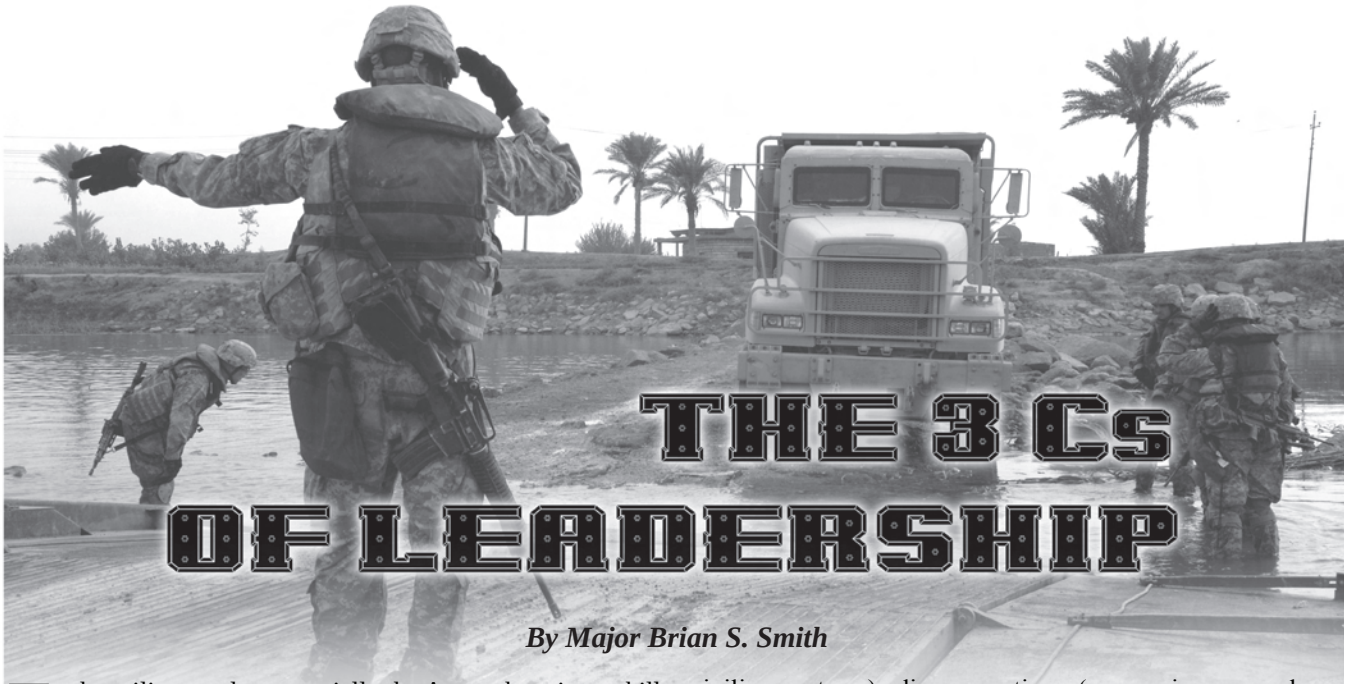

THE 3 Cs OF LEADERSHIP

By Major Brian S. Smith

In the military today, especially the Army, there is no skill more desirable for success than good leadership. The price paid for bad leadership or lack of leadership, tragically, is the ultimate sacrifice of Soldiers' lives. Good leaders do not magically appear; they are developed, or "grown from within." According to doctrine, "An Army leader is anyone who by virtue of assumed role or assigned responsibility inspires and influences people to accomplish organizational goals. Army leaders motivate people both inside and outside the chain of command to pursue actions, focus thinking, and shape decisions for the greater good of the organization."[1]

Leadership Attributes

The characteristics I look for in good leaders are the *3 Cs*: competence, confidence, and compassion. I learned these three attributes from former supervisors and noncommissioned officers (NCOs) in different forms and manners, but they all conveyed the same message. I viewed these attributes as necessary not only for good leaders but for followers as well, and adherence to them has contributed to many successes in my career on different levels.

Competence

First and foremost, good leaders need to be competent in their field. One does not need to know everything about one's field but must have breadth in knowledge and experience to receive a mission, analyze it, ask for guidance, recommend courses of actions, delegate tasks, and supervise as needed. All this is done with some level of assistance from one's peers, subordinates, and/or supervisors. For example, competent Army engineers must know the following: combat engineering (demolitions, mines, force protection, field craft, and explosives); combat construction (road, structure, or facility construction); military pipeline operations (storage and transport systems); facilities development and management (utilities and structures); power generation (military and civilian systems); dive operations (reconnaissance, salvage and recovery, destruction and demolitions, and construction operations); military bridging (tactical and nontactical); topographic and geospatial operations; and United States Army Corps of Engineers operations (military and civilian projects/activities).

Engineer officers will be not be expert in all of these areas, but they should have a general knowledge of these systems, how they work and support others, and whom to resource or leverage to get desired information and complete an assigned mission or task. When engineers join a unit, leaders and peers assume that they are technically adept and ready to advise or recommend engineer courses of actions. Many engineer officers have technical backgrounds while others just have technical training, whether professional or personal. Good engineer officers continue to develop professionally (and train) and seek mentorship to ensure that they are true combat multipliers. Leadership is not only on the battlefield or in direct conflict but also off the battlefield, such as Lieutenant General Russel L. Honore's actions and command during Hurricane Katrina, or General David H. Petraeus' expressed importance of transition teams to assist in our nation's efforts in Iraq and Afghanistan.

Confidence

Second, leaders must be confident in action and in word. This contagious confidence influences an ideology in which orders are delegated, not questioned, and followed specifically to include whatever guidance is given. One's subordinates or peers will be encouraged to "buy in" to that guidance and exhibit their own initiative when confidence is modeled by a leader. Confidence is a physical aspect illustrated by direct presentation: how one dresses, speaks, or interacts with others, professionally and personally. Good leaders know the difference between confidence and overconfidence (cockiness) and where to the draw the line; each of these two levels of confidence has a place in leadership.

Compassion

Finally, leaders must have compassion and respect for co-workers—and especially subordinates. At times, compassion requires leaders to have physical, mental, and spiritual courage. Such courage is what inspires others willingly to go the extra mile, to give 110 percent or, if necessary, to lay down their lives for a buddy. Good leaders should praise and reward members of the organization as well as counsel and punish; with punishment, good leaders look at all matters of mitigation and decide an outcome (and live with it). Leaders must recognize the dynamics of the organization and team-build to bring others on to their philosophy. The downside to compassion is that at times it can be abused; additionally, some people view compassion as a character weakness. If leaders are compassionate as well as competent and confident, compassion will be seen as strength.

Summary

Our Soldiers, their Families, and our leaders deserve our competence, confidence, and compassion. It is these ideals which inspire that private, that NCO, or that lieutenant to get up day after day in combat and say, "Let's go!" When Family members see those qualities in good leaders, they will have faith that their loved ones are in good hands and confidence that they will return home safely. Leadership is the number one business of all Army officers, next to management of resources and personnel, and leaders should strive to be impact players or combat multipliers wherever the assignment is to do their country's bidding. Leaders at all levels should continue to "fill their lamps with oil" to further develop leadership and critical thinking skills. No matter where our boots take us, we owe it to our subordinates to be competent, confident, and compassionate!

Major Smith is attending the Intermediate Level Education Course at the Command and General Staff College, Fort Leavenworth, Kansas. Previously, he was the Assistant Brigade Operations Officer in the 189th Infantry Brigade, Fort Bragg, North Carolina, and served as commander of a mechanized engineer company in the 2d Engineer Battalion and also a Bradley Fighting Vehicle Company in the 2-9 Infantry Regiment, 2d Infantry Division, South Korea. He is a graduate of the Engineer Captains Career Course and holds a bachelor's in mechanical engineering from the United States Military Academy, a master's in engineering management from the University of Missouri-Rolla (now Missouri University of Science and Technology), and is pursuing a master's in business administration at Benedictine College in Atchison, Kansas.

Endnote

[1] Field Manual 6-22, *Army Leadership*, 12 October 2006, paragraph 1-2.

("Geospatial Engineering," continued from page 47)

After eight years of engagement in the War on Terrorism, we currently have unprecedented levels of detailed geospatial data, but many Soldiers are simply unaware of these capabilities. As we continue to advance the geospatial capabilities used in battle command, it is essential that Soldiers receive the training they need to understand the operational environment. Training all Army leaders is critical in properly equipping our Soldiers for deployments. MANSCEN is conducting a training needs assessment to produce an overall training strategy to adjust professional military education so all Soldiers can better leverage geospatial capabilities. Decisions regarding geospatial engineering combat development will continue to have a significant impact on the Army, DOD, and coalition partners. These geospatial initiatives are changing the way we operate in the Engineer Regiment and across all Army functional areas. As we advance the state of the art in geospatial engineering, we maximize the informational advantage for all warfighters in successful mission execution.

Mr. Bergman is a member of the Corps of Engineers Army Geospatial Center (AGC). He is assigned to Fort Leonard Wood, Missouri, to provide direct support to TCM–Geospatial. A former United States Marine, he is a Naval Academy graduate and holds a master's in systems engineering from George Mason University.

Endnotes

[1]The Army Geospatial Enterprise (AGE) comprises the people, organizations, and technology involved in acquiring and managing geospatial data that affects all Army missions. Army battle command, consisting of operations, intelligence, mission rehearsal, and training capabilities, all depend on achieving an AGE. At its core, the AGE is a distributed database and supporting infrastructure that is based on a common suite of interoperable software. The AGE allows geospatial data to be collected, stored, fused, analyzed, and disseminated horizontally and vertically (from peer-to-peer and from echelon to echelon, down to the individual Soldier.

[2]Major David P. Burris, "White Paper on Geospatial Support to Battle Command," TCM–Geospatial, Maneuver Support Center, Fort Leonard Wood, Missouri, 9 January 2008.

[3]Figure from <*http://www.tec.army.mil/ctis/software/geospatial_services/index.html*>.

Appearing Larger Than We Are:

The Story of the 1st Brigade Special Troops Battalion, 1st Brigade Combat Team, 82d Airborne Division

By Lieutenant Colonel Frederic A. Drummond and Major James H. Schreiner

During Operation Iraqi Freedom (from June 2007 through July 2008), the 1st Brigade Special Troops Battalion (BSTB), 1st Brigade Combat Team (BCT), 82d Airborne Division, deployed to Contingency Operating Base Adder in Dhi Qar Province of southern Iraq. Initially charged with the theater security and security forces mission for Dhi Qar, al Muthanna, and Diwaniyah Provinces, the battalion conducted a successful in-stride transition to an operational overwatch mission in the provincial Iraqi-controlled province of al Muthanna and assistance in Dhi Qar. The 1st BSTB was charged with a mission set that tested the limits of the organization. The counterinsurgency (COIN) fight in the Shia-dominated, Iranian-influenced south presented difficult and unique challenges, and it led to a comment about "appearing larger than you are" by General David Petraeus, Multinational Force–Iraq (MNF–I) commander, on a visit to one combat outpost. This is exactly what the battalion was tasked to achieve and exactly what it accomplished. The 1st BSTB was the right unit, with the right capabilities, at the right time to fight counterinsurgent and criminal elements in a nontraditional BSTB role. Through the use of a dynamic task-organization leveraging additional BCT assets, a well-defined campaign design with a stringent targeting system to adjust it, detailed interagency coordination enabling, and creative small-unit leadership, the BSTB's capabilities are well suited for COIN operations.

Traditional BSTB Tasks

Before describing how the 1st BSTB achieved success, it is important to understand more traditional BSTB tasks and current tactics, techniques, and procedures that have evolved during the War on Terrorism.The doctrinal mission statement of the BSTB highlights rear area security as one of the main tasks the organization was designed to accomplish. This responsibility is where the BSTB is more limited in nature due to the lack of depth in the organization. Traditionally, the BSTB has been employed to provide intelligence and signal enablers for the BCT, limited civil-military operations (CMO) command and control (C2) oversight, military training teams, route clearance operations, some base defense operations (with significant augmentation), detainee operations, and BCT C2 support and security with the headquarters/BCT company. Many of these tasks are stovepiped toward addressing specific BCT-level requirements that a BCT commander may not have the organizational energy to focus on specifically and are rarely used in close coordination with each other.

> *"Through the use of a dynamic task-organization leveraging additional BCT assets ... the BSTB's capabilities are well suited for COIN operations."*

Often, BSTBs are used as force provider units to augment BCT operations or other task force-sized elements handling very specific tasks. Rarely is a BSTB headquarters charged with planning, synchronizing, resourcing, and executing multiple items from the BCT mission-essential task list (METL) in a BCT's area of operations. The 1st BSTB validated the

idea that the fusion of its unique capabilities into small units under a company C2 system—with the battalion providing the framework for that unity of effort—is ideal for the mission. This unique fusion provided a new way to "appear larger than we are" with some BCT enablers helping to build capabilities that lacked depth. The combination of such capabilities validates the theory described in the July-September 2006 issue of *Engineer* by then Lieutenant Colonel Thomas H. Magness, then an Army War College Fellow at the University of Texas, that 1+1+1>3 in a complex COIN fight.[1] With the right balance and clear vision, the BSTB has ideal capabilities and diverse military skills to apply to COIN operations in a BCT mission set.

The support behind the argument is generally found within the statistics over the 1st BSTB's 14-month combat tour. Three primary mission-essential tasks were assigned to the battalion:

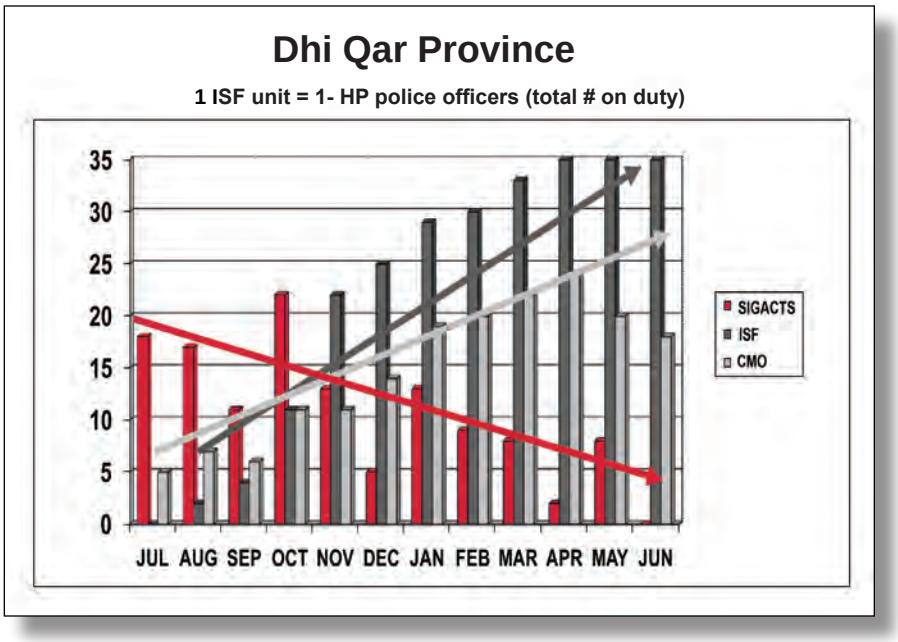

Figure 1. Trend Lines of Enemy Activity (EFP/IDF/Complex Attacks) on Coalition versus CMO Engagements/Partnerships and Capable ISF Application

- Secure freedom of movement along Main Supply Route (MSR) Tampa
- Provide operational overwatch to al Muthanna Province
- Conduct CMO for the BCT

The results for the 1st BSTB's combat actions from June 2007 through July 2008 argue that, while not a completely causal relationship, the skill sets of a BSTB can be very effective within a sound COIN strategy. The downturn in enemy operations (see Figure 1) was a result of all the teams operating in southern Iraq—to include other defense agencies, civil affairs teams, provincial reconstruction teams (PRTs), and other government agencies (OGAs)—but the battalion was a key enabler and catalyst for significant atmospheric changes in the tribal areas that had been previously untouched by coalition forces. This persistent engagement with the locals and assistance from provisional government officials aided in the tremendous success achieved by all forces listed above.

Dynamic Task Organization

On arrival in June 2007, the BSTB was assigned to secure five radio relay points along MSR Tampa and to disrupt improvised explosive device (IED) cells along the MSRs. An offensive mind-set, and some creative repositioning of critical enablers from the brigade and battalion, turned these five relay points into three legacy combat outposts (COPs) through the use of improved communications systems; mortar teams; and human intelligence (HUMINT) collection, signal, and intelligence capabilities. The remaining COPs were task-organized with a similar capability due to threats, but could easily be modified to address surges in explosively formed projectiles (EFP) activity, PRT efforts, and basic engagement needs as the mission set was modified. At COP 4 in Diwaniyah Province and COP 9 in Dhi Qar Province, the threat was almost exclusively from EFPs, complex attacks, and indirect fires (IDFs). At COP 6 in al Muthanna Province, the threat was mostly from criminals acting against Iraqi commerce, using MSR Tampa as the most expedient route from Basra to Baghdad. The task organization in Figure 2, page 52, became the essential team that staffed the COPs throughout the 14-month rotation. Guidance from the MNF–I commander was to "live among the people. You cannot commute to this fight. Position … combat outposts … in the neighborhoods we intend to secure. Living among the people is essential to securing them and defeating the insurgents."[2] The 1st BSTB provided a solid mix of capabilities when augmented by a few additional BCT assets and epitomized the General Petraeus strategy of forward engagement.

Fundamental to the success of each COP was the diverse mixture of military occupational specialties and multiple branch-specific officers. The COPs, with fewer than 100 Soldiers each, could deal with installation defense, installation support, route security, CMO, and security force partnerships. Deliberate route clearance along 250 kilometers of road led to the reduction of Tier 1 IED hot spots from eight in June 2007 to zero in March 2008. This allowed a distinct move to hold-and-build operations along that same stretch of road while maintaining flexibility for the commander to surge security forces back.

Combat engineers and military police focused efforts on security and partnership with Iraqi army, police special units, and Iraqi Highway Police (IHP), while CMO patrols engaged the populations, enabling PRTs and other agencies

to build capacity and infrastructure. Together, these efforts created space, or freedom of movement, for all engagements. HUMINT collection team (HCT) operations from COPs 4 and 9 would be integrated into all security and CMO patrols, thus filling information voids in the three provinces. That in turn led to increased freedom of movement and multiple target packages to be handed off to maneuver forces. The diverse set of capabilities brought to bear set conditions for an ever-increasing sphere of influence for the BCT in the three provinces. In essence, it set conditions for the transition from telecommunications and theater security to an effective operational overwatch mission and created space for the BCT to expand its reach and support Iraqi army operations in Basra and Amarrah with great success during April and May 2008.

Campaign Design and Targeting

The dynamic task organization is only good if all the unit efforts are working toward one common goal. Understanding the dynamics of the COIN fight, and the propensity for battalion milestones to change in achieving that goal, forced an extremely defined, yet adaptive, process to be created. Field Manual (FM) 3-24, *Counterinsurgency Operations*, has dedicated a complete chapter to the development of rigid processes that increase unit flexibility. "The campaign design must therefore guide and empower subordinate leaders to conduct the coordination, cooperation, and innovation required to achieve the campaign purpose in a manner best suited to local conditions."[3] In operations across three provinces, fighting three distinct sets of enemy influence and actions, the need for relevant systems was instrumental to any success the battalion would have.

The operational design enabled the battalion to keep its focus clearly within a security logical line of operations (LLO) with focus on the COPs and freedom of movement along the main and alternate supply routes. Flanking efforts included the operational overwatch of the al Muthanna Province and a separate LLO for the engagements with three separate PRTs. This road map for the battalion was nested within the BCT targeting cycle and allowed the battalion to adopt a one-week targeting and synchronization cycle that was adaptive and responsive enough to stay even with, or ahead of, the daily change in atmospherics. Reactions to EFP Tier 1 sight evolution; security and reconstruction changes in dynamics; a changing political landscape at provincial, tribal, and district levels; and the BCT focus on operational-level and some strategic-level planning was possible through this system. A simple fragmentary order (FRAGO) with a synchronization and execution matrix enabled resourcing to support operations along the 250-kilometer stretch of MSR. This FRAGO also included the overwatch portion of the battalion's mission.

The culmination of the process included a weekly briefing to the battalion commander that included the following:

- Intelligence summary with more detail than the normal battalion operations and intelligence briefings
- Battalion milestone review with measure-of-effectiveness trends from the previous week
- Breakdown of the high-payoff target list with actionable efforts toward achieving those milestones

New milestones were nominated in this meeting, and the high-payoff targets would be rendered active or passive for the upcoming week. Battalion planning priorities of work would be locked in by the commander and focus the staff for two weeks out. The end-state was an order that provided course corrections to the campaign plan and added maximum flexibility for the COP commanders to engage in security, partnership with Iraqi Security Forces (ISF), and reconstruction efforts. The systems allowed the commander to exercise effective battle command. In particular, the battalion could see the enemy and adapt quickly to understand the dynamics governing the environment.

"Understanding tribal loyalties, political motivations, and family relationships is essential to defeating the enemy we faced, a task more

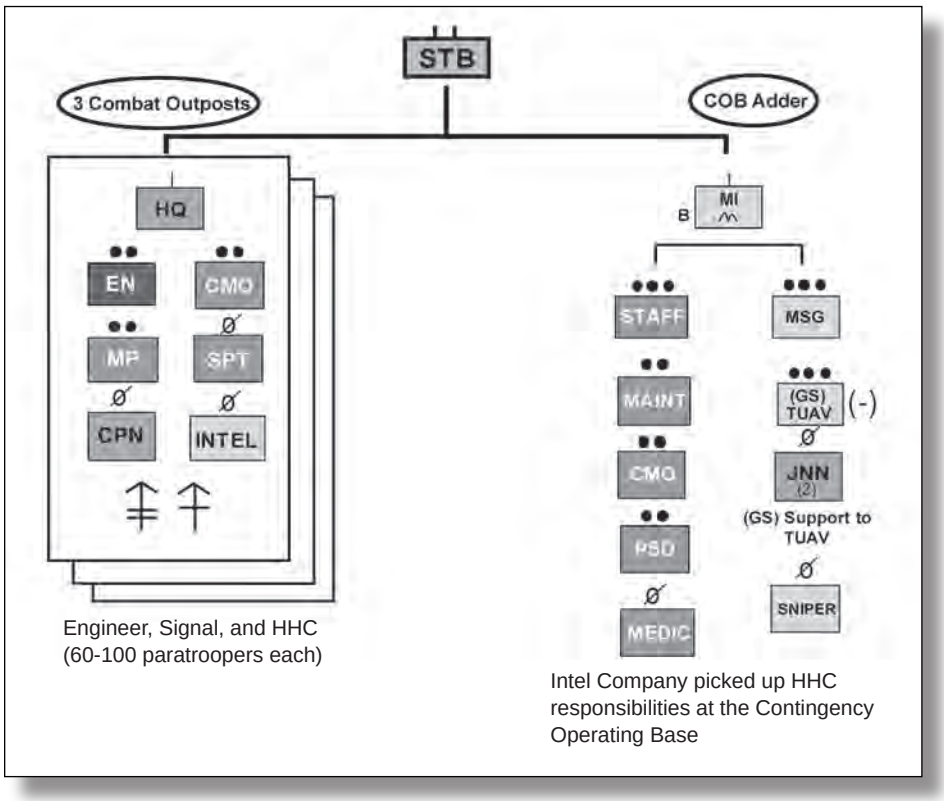

Figure 2. Task Organization

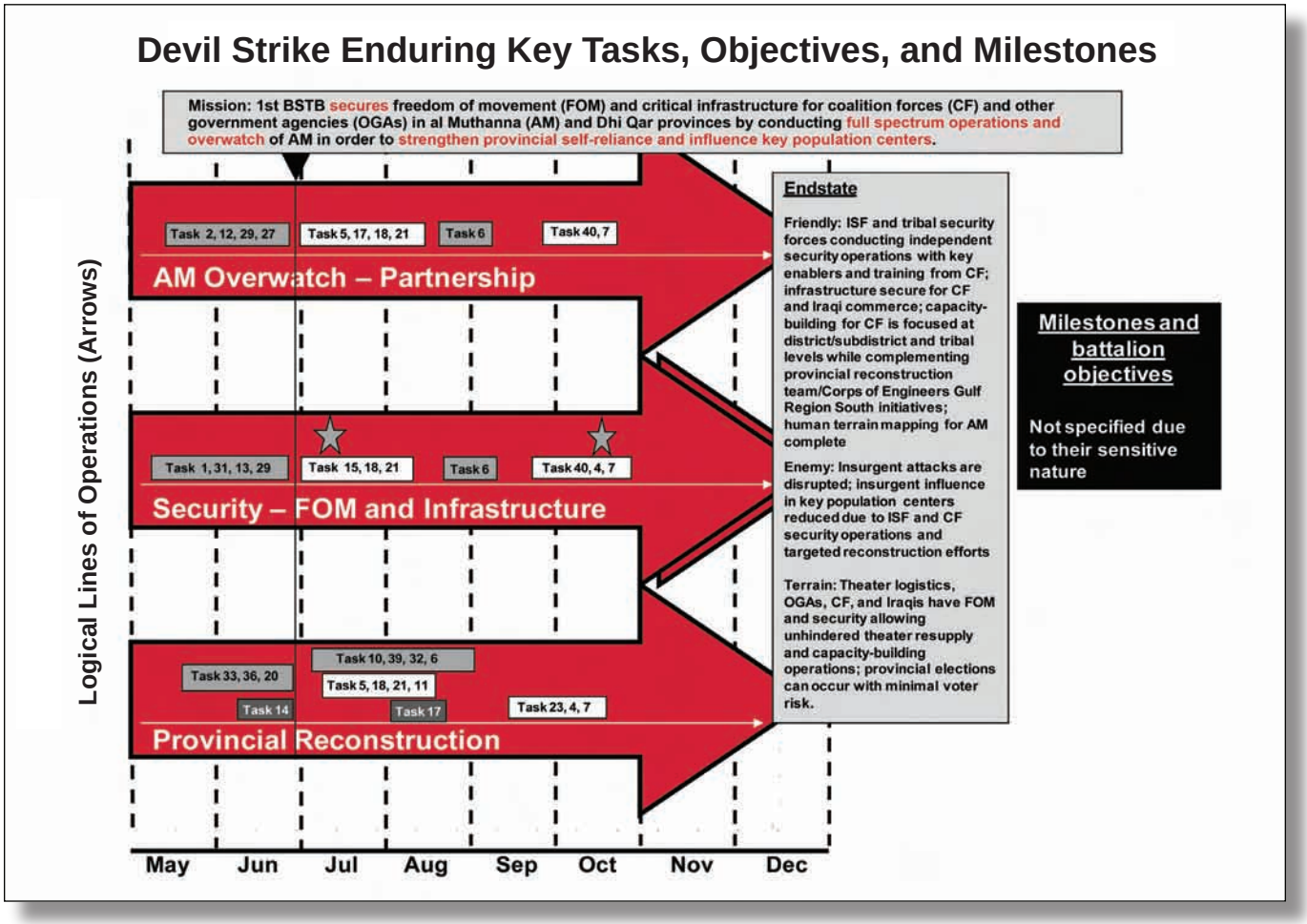

Figure 3. Battalion Milestones and Logical Lines of Operations

akin to breaking up a Mafia crime ring than dismantling a conventional enemy battalion or brigade."[4] The system created an environment within the battalion that allowed the creation of a "human terrain map," helping to feed the targeting process and answer battalion and brigade commanders' critical intelligence requirements. The process enabled the COIN fight focus, and the unique characteristics of the BSTB created the capability to address a wide array of challenges, with these systems providing the rudder for all operations.

In total, the battalion staff required external assets to implement this system, much like the COPs needed augmentation in mortar crew and HCT operators. The need for a full-time fire support/targeting officer, a signal officer, and a CMO officer were just three fills that were external tasking, but critical to mission accomplishment. Systems in a BSTB can make the battalion a large force multiplier to the BCT, but key augmentations must be addressed from a modified table of organization and equipment (MTOE) change initiative. Further review of these critical capabilities must accompany unit status reporting and drive the study of MTOE revision for the unit to be a more independent and self-sufficient enabler in both lethal and nonlethal operations in support of a BCT.

While there are some areas where help is needed, the diverse BSTB staff capabilities create an extremely positive learning atmosphere. For example, within the operations and training section alone, an engineer officer in charge led a team of two infantry captains, two military intelligence captains, a logistics captain, and a fire support officer. Making all orders and targeting operational for four different types of companies with 67 different military occupational specialties with different METL sets of core competencies was extremely complex. Leaders in a BSTB must learn each other's skill sets so that the companies can be properly planned for, resourced, and led in training and operations. The rigid campaign design and targeting process provide the framework to ensure that a common language is understood and that the diverse nature of the organization can be overcome when working outside of the core mission sets.

Interagency Engagement and Engaged Leadership

The systems in place in the 1st BSTB enabled quick recognition that a plan was on or off course. Commanders at the battalion and company levels—and their understanding of the nested commander's intent—allowed for maximum creativity in developing the "how" to achieve milestones (see Figure 3). Subsequently, the strong relationships with the Department of State (DOS) and other

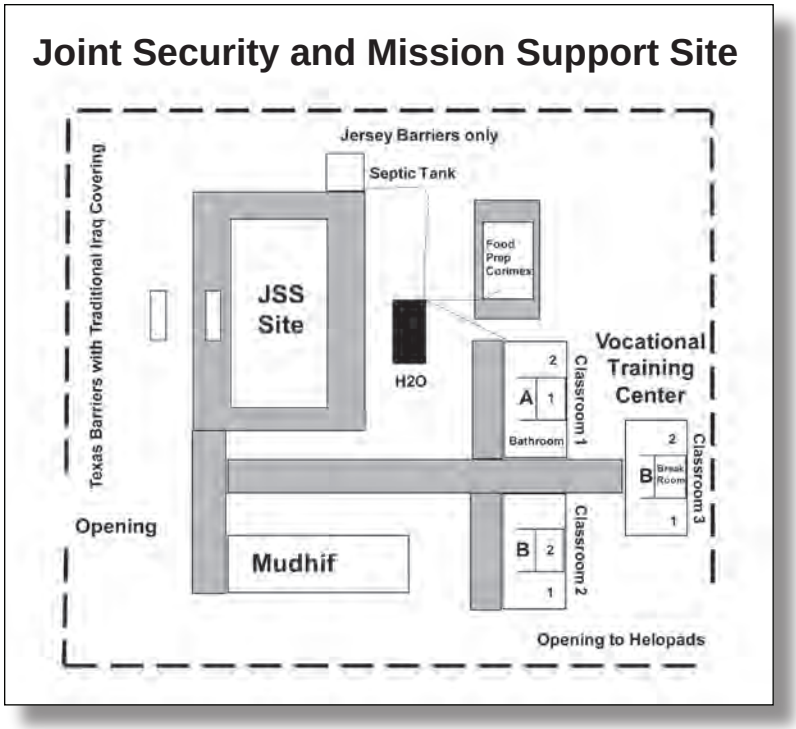

Figure 4. An Example of a JSS/MSS

governmental agencies allowed "spheres of influence" to expand rapidly. FM 3-24 has dedicated an entire chapter to leadership, which must be creative and accountable.

"Senior commanders are responsible for maintaining the 'moral high ground' in all deeds and words of their units."[5] The battalion leadership understood that while the COIN fight is extremely decentralized in nature, each commissioned and noncommissioned officer must be grounded in the commander's intent and prepared to enforce legal and ethical behavior while implementing creative solutions to win influence over the population or deny influence to the enemy. In many instances, this meant high densities of leadership with few Soldiers to conduct key leader engagements.

One prime example of battalion imagination was the creation of a joint security site (JSS)/mission support site (MSS) at COP 6 in al Muthanna Province (see Figure 4). This combined effort between the PRT, the Civil Police Authority Training Team, and coalition forces occurred from battalion through platoon levels. The 1st BSTB provided security for the C2 site, freedom of movement for the PRT throughout the province, and leverage with partners in the ISF and government to begin advanced training of special police and Iraqi army units from the site. It offered a JSS for intelligence sharing and partnership development between key players in the province, encompassing governance at the tribal and provincial levels, and security elements. This initiative was not a specified task, yet it became a beacon for other provinces, Iraqi government officials, and U.S. congressional staffers who became interested in studying because the site leveraged the capabilities of Department of Defense (DOD), DOS, and other agencies in appearing larger than we were. This one example was developed over time by the PRT team chief with the battalion and COP 6 commander and staff.

Another example of creative leadership emanated from the military police leaders at COP 6 and COP 9, who developed training plans with the IHP, the most under-resourced security forces in the ISF. Weekly classroom, range, and on-the-job training enabled the building of bonds between the units and helped deter more than 15 EFP detonations and traffic accidents.

Two examples of the BSTB's unique capabilities that would be missing in maneuver units were the engineer and CMO leaders closely working with the PRTs and military police Soldiers who were experts at traffic checkpoint operations. Given the COIN threats of small EFP and indirect-fire cells, and the limited-sized threat to the units, the BSTB brought the ideal capabilities to apply to the problem set. Couple this with an imagination that can expand and build new concepts in the interagency and multinational reality, and the unit can thrive. Many of the integration concepts for the JSS/MSS are now being studied in new DOS structures for teaching at combat training centers and in the Officer Educational System. An interagency team is currently working to develop such a structure and will become the hub for all PRT lessons learned at DOS and DOD training centers.

One area that will have to be closely developed is the DOS mind-set that an aggressive approach in engagement is needed at provincial, tribal, and district levels simultaneously. This is perhaps one area where a battalion can only cover so much ground due to lack of subject matter experts. The willingness to use those experts and reach out to the provinces plays a key part in the hold-and-build portions of a COIN fight. Even with a mixture of engineers, military police, and CMO personnel, a BSTB still is heavily reliant on DOS experts. Understanding COIN strategy is not a responsibility of DOD alone. Interagency engagement is only as good as the understanding of leaders in both organizations of COIN doctrine.

Summary

Despite many challenges, the 1st BSTB proved that it could be an extreme force multiplier in the COIN fight when left to fight as an organic battalion with key enablers from the BCT. In 14 months, it took roads most susceptible to EFP and complex attacks and reduced the frequency of attacks by as much as 90 percent in most areas and eradicated them completely in others. Augmented with a robust CMO and ISF partnership strategy, systems to keep the battalion leadership on course, and the inclusion of OGAs, the battalion enjoyed extreme success. One of the key themes of the battalion was to "extend a hand in partnership, but always remain vigilant of the threat." Learning to adapt to the

(Continued on page 64)

Lessons Learned From the Front—
Operation Enduring Freedom

By Lieutenant Colonel Ronald E. Zimmerman, Captain Caitlin M. Dempsey, and First Lieutenant Haley E. Whitfield

On 10 May 2008, the 62d Engineer Battalion (Combat) (Heavy) assumed responsibility from the 864th Engineer Battalion (Combat) (Heavy) at Forward Operating Base Sharana in Afghanistan. In preparation for this, our home station training at Fort Hood, Texas, focused on four priorities:

- Building roads, operating bases, and force protection in support of maneuver forces
- Developing strong leaders who inspire their Soldiers with the will and skill to win in combat
- Training Soldiers on basic combat and engineer-skill tasks
- Developing strong Family Readiness Groups (FRGs) and rear detachments

We capitalized on unique training opportunities to develop junior leaders at Fort Hood during our predeployment training. Our training built cohesive teams with Soldiers who shared a common bond, grounded in Warrior Skills. Finally, we built strong FRGs and rear detachments to take care of each other. Eight months into our deployment, our experiences continue to teach and challenge us. This article is an effort to share the experiences of our preparations for deployment and the personnel, logistical, and tactical challenges we have faced.

Warrior Skills as a Command Training Base

Key to our force protection success is engaged leadership and Warrior Skills training as a prerequisite to our home station mission-essential task list (METL) (construction) training. At Fort Hood, we used a battalion "gate strategy" as a control mechanism in developing trained and sustainable companies and platoons. We focused on ensuring that all Soldiers possessed the individual skills necessary to accomplish their combat portion of the mission, thus surviving in a combat environment. We focused on achieving superior skills with weapons and marksmanship, reflexive fire, first aid, communication, navigation, and physical training. We reinforced basics such as land navigation, map reading, combat vehicle identification, proper operation of assigned equipment, and the effects of personal and crew-served weapons. We aggressively trained on convoy procedures, escalation of force, and counter improvised explosive device (C-IED) drills. We used lessons from the battalion's last Operation Iraqi Freedom deployment, our Army's current doctrine, and keys tasks from the unit being relieved in place—to include training on composite risk management—to shape training management at all levels within our battalion.

We found that protection—force protection, safety, fratricide avoidance, and field discipline—of Soldiers and their equipment requires engaged leadership. "Checking the block" by having platoon and company leadership complete composite risk management website classes is not sufficient. Every activity, action, and engagement must be assessed for risk. Leaders must be on the ground looking for negative trends and ensuring that risk mitigation factors are properly implemented. Supervisors who assist in unloading a truck are no longer supervising and thus have opened up the task for a mishap. Our underlying principle for protection is engaged leadership and a steadfast enforcement of standards and discipline, regardless of the task or location.

Effects on Officer Development

Officer promotions come earlier than in the past. Second lieutenants are promoted to first lieutenant in 18 months and are then promoted to captain 16 to 20 months later. With time spent attending the basic officer leader course (BOLC), and many officers attending schools such as Airborne, Ranger, and Sapper after BOLC, second lieutenants may be in a unit for only 6 to 8 months before pinning on first lieutenant bars. At that point, young officers are getting ready to move to either a company executive officer position or a headquarters staff position. This means that many of today's officers have very little time to learn and grow as platoon leaders. Because growth comes from institutional knowledge and experience, many of our young officers lack the cumulative advantage and practical intelligence associated with years of experience. The growth of young officers requires practical learning engagements that come from 12 to 18 months as a platoon leader. If officers had additional platoon leader time before promotion to captain, they would learn more of the basics needed to build on throughout the rest of their careers. This also affects the ability of a commander to send a promotable first lieutenant to the career course. Often, that lieutenant may not have experienced various jobs within the battalion before moving on.

The opposite side of that argument is that young officers frequently complete their platoon leader time in combat. To use the "drinking from a fire hose" analogy, today's platoon leaders are learning more in a shorter amount of time because of current wartime situations. A young lieutenant learns more quickly by leading Soldiers in combat than by just training with them at home station, although sometimes the lesson is a shortcut rather than the standard. Thus, our model of officer growth should account for combat experience, maturity, and career desires. We should focus on quality of leadership and practical experience, versus time in a leadership position.[1]

Out-of-Cycle Deployments

Out-of-cycle deployments under the auspice of modularity are negatively affecting our flexibility in officer and noncommissioned officer (NCO) development. The battalion has five companies deployed to Afghanistan and one to Iraq. However, there are only three companies the battalion commander has flexibility in moving officers and NCOs through. Transfers within the battalion are impossible with the company in Iraq. One of the companies deployed to Afghanistan three months ahead of the rest of the battalion and has a home station at Fort Sill, Oklahoma, rather than Fort Hood. As a result, officers and NCOs can only be moved in or out of that company for short periods and must return to their original company for redeployment. Another company, although based at Fort Hood with the majority of the battalion, deployed two months ahead of the battalion. Its officers and NCOs also can be moved for only short amounts of time because they have to redeploy with their original company.

These restrictions limit the transfers the battalion commander can order within the battalion to move captains and promotable first lieutenants. More important, out-of-cycle deployments and modularity can inhibit officer growth in connection with early promotion cycles. Planners at the United States Army Forces Command (FORSCOM)-level must pay close attention to out-of-cycle deployments. Just because we can deploy engineer companies outside their parent battalion headquarters does not necessarily mean we should.

Demand for Sustainment Engineers in Stability Operations

Counterinsurgencies and stability operations like the current War on Terrorism are taxing on engineer units. In high-intensity conflicts, the infantry, armor, and other combat units bear much more of the brunt of responsibility. A combat heavy engineer battalion's role is inversely proportional to the intensity of the conflict. In counterinsurgency operations, engineers—and more specifically, construction engineers—bear a greater amount of responsibility. As the United States expands to remote areas of Afghanistan for security purposes and helps build infrastructure there, construction engineers are either doing the construction or executing quality assurance and quality control of local national construction. Construction engineers in most cases are either building new forward operating bases (FOBs) or expanding existing FOBs well before the arrival of maneuver forces. We have found that it takes nearly two-and-one-half months to build a battalion task force-level operating base. Before a maneuver unit sends a squad of Soldiers to a tiny outpost for weeks at a time, engineers are sent there to build up the observation post and make it as livable as possible for the maneuver Soldiers. Naturally, security is provided by maneuver forces. Engineers are in such high demand during stability operations that it makes it even more difficult for an engineer commander to release any veteran officers or NCOs.

The high demand for engineer units during this ever-changing counterinsurgency fight also results in more frequent deployment cycles for the engineers. During home station predeployment training, deploying unit commanders are reluctant to transition unit-level leadership as teams are forming. There is little time for retraining new team, platoon, company, or staff leadership. Commanders become even more unwilling to release officers and NCOs in exchange for untrained new additions to the battalion. However, if the officers and NCOs are going to continue their development, they need to move on to Army schools. Commanders must accept that they might not have a full year of training with a group of officers and NCOs and then deploy for 12 months with that same group of Soldiers. More important, the United States Army Human Resources Command (HRC) must fill units on a steady cycle versus once per year. Yearly dumps of second lieutenants straight out of the basic course, compared to a steady flow of replacements, lead to massive changes.

Standard Guard Tower Construction

Officer replacements and school slots must be aligned with redeployment of units. The increased need for engineers has created out-of-cycle deployments for engineer companies that negatively affect officer development.

Legacy Battalion in Dispersed Operations

Legacy combat heavy engineer battalions are not designed for dispersed operations. Until recently, the 62d Engineer Battalion was the only construction battalion in-theater during expansions in Regional Command–East (RC–E) and Regional Command–South (RC–S). The battalion is a legacy modified table of organization and equipment (MTOE) engineer battalion operating as a transformed modular unit dispersed across a wide area. Our staff is not nearly as robust as a transformed battalion staff. Controlling the expansion of multiple battalion- and brigade-level operating bases, while simultaneously controlling upgrades of existing operating bases, greatly stretched our doctrinal command and control (C2) capabilities. We now have four C2 nodes to support expansion and sustainment construction at—

- FOB Sharana, the battalion tactical operations center (TOC).
- Bagram Air Base, the battalion administration/logistics operations center.
- FOB Shank, where RC–E is being expanded to support the arrival of a brigade combat team (BCT).
- Kandahar, in support of RC–S/Task Force 2-2 Infantry expansion, which will soon move north to FOB Wolverine.

Each of these command nodes requires additional personnel and equipment above MTOE authorization. To maintain an aggressive maintenance posture, the battalion uses four different supply/support activity locations. Soldiers fly out of Kandahar and Bagram for rest and recuperation leave and redeployment because of our dispersion. Liaison officer teams are located at each Class IV construction material site to maintain visibility of inventories and the status of material being pushed from the Class IV yard to the construction site. The battalion purchased 20 satellite telephones and minutes for improved C2 and for Soldier morale, given the units' remote locations. In the end, our MTOE relevant to C2 does not fit the current dispersed construction fight. However, thanks to non-traditional methods, we maintain construction efforts in spite of the increasing construction requirements.

Class IV Management

Acquisition and battle-tracking of Class IV construction material and the lack of host nation trucking reliability are unique challenges within Afghanistan. Contractor-run Class IV yards control construction material. There are five supply yards in-country responsible for filling and shipping our construction material. While each Class IV yard performs the same function, they do not all provide requesting units the same information necessary to acquire and track a bill of material (BOM) in the most efficient manner possible. Class IV yards are responsible for loading and shipping material to each project site. However, they do not accurately keep track of the material they ship to each site, and each yard has a different standard for reporting what it has shipped. Members of the logistical community work hard at maintaining their Class IV yards. However, they do not understand construction well enough to realize how important Class IV management is to engineers or how management of construction material must be treated differently from other classes of supply.

As mitigation, we recently created liasion officer teams at Class IV yards to provide visibility on inventory and jobsite shipment amounts. However, 3- to 4-week project delays are common due to operational impacts and bad weather. There are no Army truck companies in-theater, which means that all construction materials travel by host nation trucks. Delayed delivery resulted in wasted time, material, and money. Education about project management and vulnerability identification of tactical risks remains paramount for officers, given the fluid construction environment. Company commanders identify project vulnerabilities, mitigation, and decision points (complete with priority intelligence requirements, friendly force information requirements, and essential elements of

friendly information, given insurgent attacks associated with movement of Class IV materials and equipment).

Finally, engineers should simply take on and resource the task of Class IV management, similar to the standard in which we associate our actions with the BCT support battalion for Class IV/V supply points and mine dumps. Our plugs into the sustainment brigades would then be mission-essential tasks for battalion and brigade headquarters.

Standard Building Designs

Standard building designs have greatly increased efficiency in project management, construction, and acquisition of Class IV construction material. At the time of the battalion's arrival, different designs for similar buildings were used at each construction site. Three months into the deployment, a massive effort began to expand existing operating bases to receive additional maneuver forces repositioning to Afghanistan. Joint Facilities Utilization Board (JFUB) packets with incomplete designs were rapidly completed in order to jump-start the construction process.

"Key to our force protection success is engaged leadership and Warrior Skills training as a prerequisite to our home station mission-essential task list (METL) (construction) training."

However, the lack of detailed plans resulted in project delays caused by inaccurate material ordering and frustrated movement of high-priority Class IV materials. To mitigate these issues, the battalion developed standard building designs for guard towers, semipermanent wooden "B-huts," Southeast Asia hut TOCs, helicopter landing zones (HLZs), and company-level contingency operating posts (COPs). Each design focused on available lumber versus off-the-shelf dimensional lumber. For example, the guard tower design called for 21-foot lengths of 8-inch by 8-inch lumber, but the best we could get in Afghanistan was 16-foot lengths. To gain the same load strength as 8-inch by 8-inch columns, we spliced and laminated five 16-foot lengths of 2-inch by 8-inch lumber, using designated nail and bolt patterns.

We implemented battalion standard designs based on subject matter expert and company-level experience. Building guard towers, B-huts, and TOCs were one company's strong point, while another company became known as our "cash cow" because of its ability to quickly build company-level COPs. Yet another company built most of the "hard huts," (B-huts with indirect-fire protection) in RC–E. Our horizontal assets built most of the HLZs and fuel farms, so their expertise became the battalion benchmark. Overall, standard designs increased our productivity in ordering BOMs and improved jobsite quality control and quality assurance. Standard designs greatly aided in construction rehearsal before beginning a project since squad leaders could determine their work effort and team taskings.

Moving a Combat Heavy Engineer Line Company

Traversing the battlefield provided many challenges to a combat heavy engineer line company that maneuver forces do not face. Frequently, mission dictates the movement of a single construction company, or even platoon, more than 300 kilometers with heavy engineer equipment. By MTOE, one engineer company consists of five M916 tractors with M870 trailers. A routine FOB construction mission typically requires 10-15 pieces of heavy engineer equipment, to include bulldozers, hydraulic excavators, bucket loaders, rollers, graders, and scrapers that weigh up to 76,000 pounds. Due to their limited number of organic transportation assets, engineer units are forced to rely on the support of host nation trucking, which could cause project delays, increased maneuver time between construction sites, and increased threat to Soldiers. To mitigate the obvious risks, units are forced to integrate the local national trucks into their convoys to ensure the security and timely arrival of their equipment and materials. If a request were submitted for ten 40-foot, flatbed local national trucks, only six would show up on the specified date with adequate specifications. Many local nationals overestimate the quality of their personally owned trucks. It is not uncommon to destroy the axle of a local national truck or turn a truck on its side during the process of loading a scraper or bulldozer in preparation for movement to the next construction site. The local national trucks are not equipped to support the weight of up-armored engineer equipment.

Adding local national trucks to a ground assault convoy greatly reduces the average speed and greatly increases the probability that the convoy will need assistance. Whether it is a flat tire, inadequate fluids, engine failure, or the mere inability to transport the assigned load, the host construction-maneuvering unit is forced to assist or recover the deadlined local national truck. This can force a convoy to stop in the middle of hostile terrain to provide support to the local national to ensure the safe arrival of the unit's equipment. Forcing a combat heavy engineer unit to stop and dismount adds a significant level of threat to an already dangerous mission of traveling across the battlefield. Heavy construction engineer units are not equipped to precisely maneuver, effectively engage, and actively pursue the enemy, characteristics that are commonly found in light maneuver units. Uncoiling a heavy construction engineer unit takes a great deal of time and precision that higher-echelon command units may not take into account during their planning process.

Conclusion

Maintaining focus on the mission is essential, regardless of the time remaining in our deployment. Our challenge is not to lose focus or become complacent in enforcing standards and discipline. Each construction task is another opportunity to increase work efficiency, sustain our Warrior Spirit, and maintain our position as builders of choice. Communication remains paramount as we continue to find every opportunity to mentor and develop the battalion's Soldiers and leaders. Moreover, given the battalion's dispersed environment and limited communication, each command visit is a detailed leader engagement that targets young leaders. We must communicate that deployment relief is in sight. More important, we must communicate that senior Army leadership is addressing improvements in schooling, assignments, and dwell time. Our Soldiers and leaders deserve honest dialogue on how no other organization in the world could sustain what our Army has completed over the last decade.

Lieutenant Colonel Zimmerman is Commander, 62d Engineer Battalion, now deployed to Afghanistan. Prior assignments include chief of plans for the 4th Infantry Division's initial assault into Iraq; operations officer for the 299th Engineer Battalion; operations officer for 1st Brigade Combat Team, 4th Infantry Division; and chief of plans for the 4th Infantry Division's second Operation Iraqi Freedom deployment. He holds a bachelor's in civil engineering–structures from the University of Wisconsin-Platteville, a master's in engineering management from the University of Missouri–Rolla (now Missouri University of Science and Technology), and a master's in airpower art and science from the School for Advanced Airpower Studies.

Captain Dempsey is the assistant operations officer and engineer Class IV manager with the 62d Engineer Battalion. Prior assignments include company executive officer and horizontal platoon leader. She holds a bachelor's in elementary education from Wake Forest University.

First Lieutenant Whitfield is the 62d Engineer Battalion assistant operations officer and battle captain. Previous assignments include vertical platoon leader and executive officer. She holds a bachelor's in engineering management from the United States Military Academy.

Endnote

[1] The retention of officers and NCOs is likely affected by the strain in the United States Army between mission accomplishment and officer development. The operational tempo in today's Army has caused a backlog of officers and NCOs in many units. Units are reluctant to release officers or NCOs because they have been trained for the upcoming deployments. Commanders, understandably, do not want to lose that training by releasing the veterans and deploying with new officers and NCOs. This is causing a long-range deterioration of both the officer corps and the NCO corps. Three factors are probable reasons that units do not release officers and NCOs in a timely manner that would benefit their careers. These factors, which are specifically focused on engineer units, are—

- Early promotion of young officers.
- Heavy use of engineers during counterinsurgency fights.
- Modularity or out-of-cycle deployment of engineer companies without their parent battalion headquarters.

I contend that we must understand from their viewpoint the challenges our junior leaders are experiencing within the United States Army. Accelerated timelines for officer promotions, high demand on engineer units for deployment purposes, and the structure of engineer units are, to some degree, causing friction with our young officers. We must communicate with our company-grade officers the same way we do with our young Soldiers. Senior leaders must understand the difference in generational perceptions between themselves and their junior officers and NCOs.

It is important for senior leaders to understand that our "Generation Y" leaders (those born after 1978) grew up in a climate of uncertainty, in which their adolescent years may have included the experience of parents divorcing and job loss. Members of Generation Y worry about their financial future, especially with today's market meltdown. As a result, they are less inclined to be loyal to—or feel a connection with—their work place. They expect instant gratification because they have faster access to information, thanks to technology. They prefer challenges to their abilities and thus career advancement. When we put into context the perceptions about Generation Y, such as the desire for instant gratification, preference for a casual environment (not to be confused with lack of professionalism), feeling of entitlement to job benefits they've not yet earned, and comfort with technology, we see four basic challenges from their viewpoint:

- Twelve- to fifteen-month deployments with minimal dwell time translates to minimal time with family when not deployed.
- Officers are stuck in the same unit too long when they deploy twice over the course of four to five years. (This may be a double-edged sword in that some young officers are probably interested in having multiple changes of station, as opposed to those with families, who probably wish for longer assignments to reduce the number of moves.)
- The Army system of formal training is not intellectually stimulating enough, considering their usual level of education.
- There is too much micromanagement, which does not empower company-grade leaders.

Taken in context, this list becomes a tool to gain a better understanding of the strain between mission accomplishment and officer development in order to reach a balance between operational deployments and officer retention. (California State University, Fullerton, "The Gen Y Perceptions Study," *<http:// www.spectrumknowledge.com/signatureprograms/index.html>*, 2008.)

ENGINEER DOCTRINE UPDATE

U.S. Army Maneuver Support Center
Training and Doctrine Development Department
Doctrine Division, Engineer Branch

Publications Currently Under Revision

Publication Number	Title	Date	Description (and Current Status)
FM 3-34	*Engineer Operations*	Jan 04	This is the engineer keystone manual. It encompasses all engineer doctrine; integrates the three engineer functions of combat, general, and geospatial engineering; and addresses engineer operations across the entire spectrum of operations. **Status:** The estimated date for posting to Army Knowledge Online (AKO) is 3d Quarter FY09.
Organizational Manuals			
FM 3-34.22 (FM 3-34.221) (FM 5-71-2) (FM 5-71-3) (FM 5-7-30)	*Engineer Operations – Brigade Combat Team and Below*	Pending (Jan 05) (Jun 96) (Oct 95) (Dec 94)	This new manual will encompass engineer operations in support of brigade combat teams (BCTs) (heavy, infantry, and Stryker–the armored cavalry regiment) and their primary subordinate units (infantry battalion, Stryker battalion, combined arms battalion, and reconnaissance squadron). This manual will supersede FM 3-34.221, FM 5-7-30, FM 5-71-2, and FM 5-71-3. **Status:** Published February 2009.
FM 3-34.23 (FM 5-116) (FM 5-100-15) (FM 5-71-100)	*Engineer Operations – Echelons Above Brigade Combat Team*	Pending (Feb 99) (Jun 95) (Apr 93)	This is a new manual that will encompass engineer operations in support of all engineer operations above the BCTs (division, corps, and theater). The intent is to consolidate and revise three engineer FMs that provide doctrinal guidance for the entire spectrum of engineer operations supporting echelons above the BCT level. This manual will supersede FM 5-71-100, FM 5-100-15 and FM 5-116. **Status:** Comments closed on final draft; estimated publishing date is 4th Quarter FY09
Combat Engineering			
FM 3-90.11 (FM 3-34.2)	*Combined Arms Mobility Operations*	Aug 00	This is a full revision, to include renaming and renumbering of FM 3-34.2, *Combined Arms Breaching Operations*. Changes in the force structure have required adjustment of the tactics, techniques, and procedures (TTP) associated with breaching and clearance operations. **Status:** On hold for release of FM 3-90, *Tactics*
FM 3-90.13 (FM 5-102) (FM 90-7)	*Combined Arms Obstacle Integration*	Sept 94 Mar 85	This revised manual will contain the basic fundamentals associated with countermobility operations and will incorporate aspects of the contemporary operating environment (COE). **Status:** On hold for release of FM 3-90, *Tactics*.
FM 3-34.300 (FM 5-103)	*Survivability*	Jun 85	This manual provides survivability information needed by commanders and staff at the tactical level. It includes guidance on integrating survivability into planning and order production and creation of the engineer running estimate. It provides examples of a survivability capabilities card, matrix, and timeline to assist with the planning, revision, and conduct of specific survivability tasks. **Status:** On hold for release of FM 3-10, *Protection*.

ENGINEER DOCTRINE UPDATE

U.S. Army Maneuver Support Center
Training and Doctrine Development Department
Doctrine Division, Engineer Branch

Publication Number	Title	Date	Description (and Current Status)
		General Engineering	
FM 3-34.400 (FM 5-104)	*General Engineering*	Nov 86	This manual describes the operational environment (OE) and how to apply and integrate general engineering principles in support of full spectrum operations. It focuses on the establishment and maintenance of lines of communications and engineer support to sustainment operations throughout the area of operation. Although not designated as a multi-Service publication, it is intended to inform all Service components of the types of general engineering tasks, planning considerations, variety of units available to perform them, and the capabilities of Army engineers to accomplish them. **Status:** Published December 2008.
FM 3-34.410 Volumes I & II (FM 5-430-00-1 & 5-430-00-2)	*Design of Theater of Operations Roads, Airfields, and Helipads*	Aug 94; Sep 94	This manual will serve as a reference for engineer planners in support of joint and theater operations in the design of roads, airfields, and helipads. This manual is currently dual-designated with the Air Force. The Navy plans to adopt it as well. **Status:** Adjudicating comments on the final draft.
FM 3-34.451 (FM 5-472)	*Materials Testing*	Dec 92	This manual will provide technical information for obtaining samples and performing engineering tests and calculations on soils, bituminous paving mixtures, and concrete. For use in military construction. The test procedures and terminology will conform to the latest methods and specifications of the American Society for Testing and Materials (ASTM), the American Concrete Institute (ACI), and the Portland Cement Association (PCA), with alternate field testing methods and sampling techniques when complete lab facilities are unavailable or impractical to use. **Status:** Adjudicating comments on the final draft.
FM 3-34.465 (FM 3-34.465 & FM 3-34.468)	*Quarry Operations*	Mar 05; Dec 03 (Apr 94)	This manual outlines the methods and procedures used in the exploration for and operation of pits and quarries. It provides information on equipment required for operating pits and quarries and for supplying crushed mineral products, but does not cover the operation of the stated types of equipment. This collaborative effort with the Navy includes the newest technologies and current practices. **Status:** Preparing the final draft for staffing to the force.
FM 3-34.469 (FM 5-484)	*Multi-Service Well Drilling Operations*	Mar 94	This manual is a guide for planning, designing, and drilling wells. It focuses on techniques and procedures for installing wells and includes expedient methods for digging shallow water wells, such as hand-dug wells. This collaborative effort with the Navy includes the newest technologies, current practices, and revised formulas. **Status:** The estimated date for posting to Army Knowledge Online (AKO) is 3d Quarter FY09.

ENGINEER DOCTRINE UPDATE

U.S. Army Maneuver Support Center
Training and Doctrine Development Department
Doctrine Division, Engineer Branch

Publication Number	Title	Date	Description (and Current Status)
General Engineering (continued)			
FM 3-34.485 (FM 5-415)	*Firefighting Operations*	Feb 99	This manual gives directions on deploying and using engineer firefighting teams. These teams provide fire prevention/protection, aircraft crash/rescue, natural cover, and hazardous material (HAZMAT) (incident) responses within a theater of operations (TO). This is a parallel effort with the revision of the firefighting Army regulation (AR) to bring both policy and doctrine current with required certifications, newest technologies, and current practices. **Status:** Initiating the program directive and developing the initial draft.
FM 3-34.500 (FM 3-100.4)	*Environmental Considerations in Military Operations*	Jun 00	This manual provides environmental protection procedures during all types of operations. It states the purposes of military environmental protection, a description of legal requirements, and a summary of current military programs. It also describes how to apply risk management methods to identify actions that may harm the environment and appropriate steps to prevent or mitigate damage. **Status:** The estimated date for posting to Army Knowledge Online (AKO) is 3d Quarter FY09.
Geospatial Engineering			
FM 3-34.600 (FM 3-34-230)	*Geospatial Operations*	3 Aug 00	This full revision of FM 3-34.230, *Geospatial Operations*, will incorporate changes as a result of FM 3-34, *Engineer Operations*, and FM 3-0, *Operations*. Geospatial engineering consists of those engineer capabilities and activities that contribute to a clear understanding of the physical environment by providing geospatial information and service to commanders and staffs. **Status:** Developing the final draft.

NOTE: Current engineer publications can be accessed and downloaded in electronic format from the Reimer Digital Library at <*http://www.adtdl.army.mil*> or the MSKN website at <*https://www.us.army.mil/suite/page/500629*>. The manuals discussed in this article are currently under development. Drafts may be obtained during the staffing process or by contacting the engineer doctrine branch at: Commercial 573-563-0003, DSN 676-0003, or <*douglas.merrill@us.army.mil*>. The development status of these manuals was current as of 10 February 2009.

("Clear the Way," continued from page 3)

*A **Regimental Family** of the world's finest military engineers who **lead to serve others** and answer the call to **solve the commander's toughest problems**. A Regiment organized into **highly flexible, tailorable, and adaptive units** capable of supporting anyone, anywhere, with the right engineer capability. A Regiment filled with Soldiers **inspiring each other to go beyond** "Let Us Try" and achieve "Well done, engineer!"*

Is this vision of the Engineer Regiment and supporting key strategic tasks carved in stone? No, this is the mark I've personally set on the wall—my estimate of the way forward. I urge you to make your own assessment and come to ENFORCE prepared to be an active participant in the professional debate that will confirm this vision and chart our future. I only ask one thing…come prepared to take your historic experience and help shape the legacy we will pass on to our young engineers who will clear and build the way for our Army in the future.

Continual Assessment and Revision of SOPs

By First Lieutenant Michael P. Carvelli

Current deployments to Operation Enduring Freedom and Operation Iraqi Freedom are forcing light, airborne, and mechanized units to operate as if they were motorized. The prevalence of high-mobility multipurpose wheeled vehicles (HMMWVs) and the new mine-resistant, ambush-protected (MRAP) vehicles have been the main facilitator of this change.

Platoon- and company-level leaders are the primary personnel responsible for recognizing and adapting to the continual changes occurring on the battlefield. Company commanders, platoon leaders, and platoon sergeants should be the driving force of continual assessment, rehearsal, training/ execution, and refinement of standing operating procedures (SOPs). Input from Soldiers filling all positions within a unit should be included as part of the continual assessment process. A patrol leader cannot fill all roles and relies on the information provided by gunners, drivers, dismounts, and others to improve all the areas included in the SOP.

After a deployment, the following areas of the SOP and unit training have undergone constant revision:

- Operations
- Maintenance/recovery
- Communications
- Medical needs
- Interpreters

Operations

Mission Briefs. Also known as "convoy briefs" or "patrol briefs," mission briefs should always be modeled after the five-paragraph operations order format. Signal plans, frequencies, priorities of medical support, and locations of key leaders typically do not change. Continual reviews of the SOPs are verbal precombat checks that the patrol leader gives during the brief. Add or delete what is relevant and applicable each time a mission brief is given.

Clearing Techniques. Integrate all host nation security forces to improve security and provide the direct link with locals. Always adjust to enemy tactics, techniques, and procedures (TTP). Consider the enemy's tactics, as they are always evolving, and adjust unit TTP accordingly.

Load Plans. These should be detailed enough to cover all mission-essential equipment, but not be so micromanaged that they detract from operator preference. Dictate where medical equipment, sensitive items, ammunition, and maintenance parts belong in each type of vehicle to ensure that Soldiers can quickly move to a vehicle and resupply as needed.

Maintenance/Recovery

Linkup. Develop SOPs and linkup procedures to integrate recovery assets or other units that assist with recovery. Define the roles of each element/leader—security, recovery, liaison—before the operation is conducted.

Equipment. Redundancy of recovery equipment such as tow straps, sling legs, and tow bars within the patrol are very necessary. For example, tow straps tend to break after just a single use. With the increase in weight and protection of vehicles, it is necessary to adapt recovery and operating equipment to achieve effective results in-sector. Spare recovery equipment is a must for all units.

Training. Practice recovery techniques across all vehicles within a patrol. Understanding the capabilities of recovery equipment can give leaders an increased ability to call for dedicated recovery assets while on a mission. This increases the unit's self-recovery ability and reduces the time that a unit is exposed with broken equipment.

Communications

Succession of Signal. Model communications after the primary, alternate, contingency, and emergency plan. Just like the succession of command, this gives each leader an immediate list when systems become unusable or unreliable.

Alternate Means. Each type of communication offers distinct advantages and disadvantages to the user. Leaders may be exposed to situations when one type of communication is ineffective and will need to immediately transfer to another type. Continual training and communication exercises are beneficial to units at all levels.

Medical Needs

Training. Preparing Soldiers for the need to provide lifesaving medical assistance will boost their confidence and improve their competence.

- *Monthly scenario-based training.* Complacency becomes more prevalent the longer a unit is deployed, and leaders must continue training to fight it. Keeping training both realistic and difficult ensures that each Soldier is prepared throughout the deployment.

- *Intravenous (IV) stick practice.* Practice giving IV injections under red light, while using night vision goggles, and while both patient and responder are wearing complete personal protective equipment. This will increase the lifesaving abilities of the Soldiers and give them confidence when injuries actually occur.
- *Limited visibility practice.* Perform all medical tasks under conditions of good and limited visibility to increase competence.

Combat Lifesavers (CLS). All personnel should be CLS-qualified. This is enforced very well within company-level units, but CLS certification should not end once the deployment begins. Plan and resource monthly or quarterly refreshers.

Standardization. The setup and location of all medical equipment should be standardized across a patrol. This includes the standardization of all individual first aid kits and CLS bags. The ability to quickly identify the location of medical equipment ensures effective and timely treatment.

Interpreters

Medical. Ensure that interpreters are CLS-qualified. Since interpreters are a combat multiplier, basic medical training will be extremely useful when needed.

Alternate Roles. Define the interpreter's role for each battle drill. For each drill, provide a task and purpose, such as "respond to a vehicle rollover" or "react to contact." The interpreter should have a designated place and activity that assists the unit with accountability during combat.

Quick Brief. Speak with the interpreter shortly before attending a meeting or speaking to a group of people to ensure that the interpreter understands your message clearly. This will clarify most of the speech. Also, the interpreter represents the speaker and should understand that voice inflection and emphasis are required across the language boundary.

Summary

Continual after-action reviews of missions and training will further refine any SOP that a unit uses. Input from gunners, drivers, truck commanders, medics, and others will enhance the efficiency and effectiveness of the unit and give each Soldier more motivation to speak in support of change. This ensures that all activities are streamlined and that each Soldier can improve the existing SOPs for future operations.

First Lieutenant Carvelli is the battalion engineer for the 3d Battalion, 75th Ranger Regiment. He has served as a task force engineer and sapper platoon leader with the 173d Special Troops Battalion. He holds a bachelor's in civil engineering technology from the Rochester Institute of Technology and has completed the Fundamentals of Engineering Exam in Pennsylvania.

("Appearing Larger," continued from page 54)

challenges and threats was a daily fight, but accomplished to a high standard. It is possible for a BSTB to operate successfully as a multifunctional battalion. It is about appearing larger than we are as a coalition and will continue to be as long as we are asked to fight and win the nation's wars.

Lieutenant Colonel Drummond is the Director of Operations, Task Force Bragg, XVIII Airborne Corps, Fort Bragg, North Carolina. Previous assignments include Commander, 1st Brigade Special Troops Battalion, 1st Brigade Combat Team, 82d Airborne Division; USCENTCOM ground operations officer and J3 executive officer; Combined Task Force 82 Senior Engineer, Operation Enduring Freedom; 307th Engineer Battalion executive and operations officer; and observer-controller (Scorpion and Sidewinder Teams) at the National Training Center, Fort Irwin, California. He holds a bachelor's in industrial management from the University of Nebraska–Kearney and a master's in business administration through Embry–Riddle University. He can be contacted at <frederic.drummond@us.army.mil>

Major Schreiner is an engineer officer serving as the 1st BSTB's executive officer. He was previously a battalion operations officer during Operation Iraqi Freedom. He served as a company commander in Operation Iraqi Freedom and as a strategic reconstruction officer to Combined Forces Command–Afghanistan Engineer Directorate in 2005. He holds a master's in engineering management from the University of Colorado and is a certified project management professional. He can be contacted at <james.schreiner@us.army.mil>.

Endnotes

[1] Lieutenant Colonel Thomas H. Magness, "Brigade Special Troops Battalions, Part I: All the Way In," *Engineer*, July-September 2006, p. 47.

[2] General David H. Petraeus, "Multinational Force–Iraq Commander's COIN Guidance," *Military Review*, 21 June 2008, p. 1.

[3] Field Manual (FM) 3-24, *Counterinsurgency Operations*, December 2006, p. 4-6.

[4] John A. Nagl, *Learning to Eat Soup With a Knife: Counterinsurgency Lessons From Malaya and Vietnam*, University of Chicago Press; Chicago, Illinois, 2005, p. 13.

[5] FM 3-24, p. 7-2.

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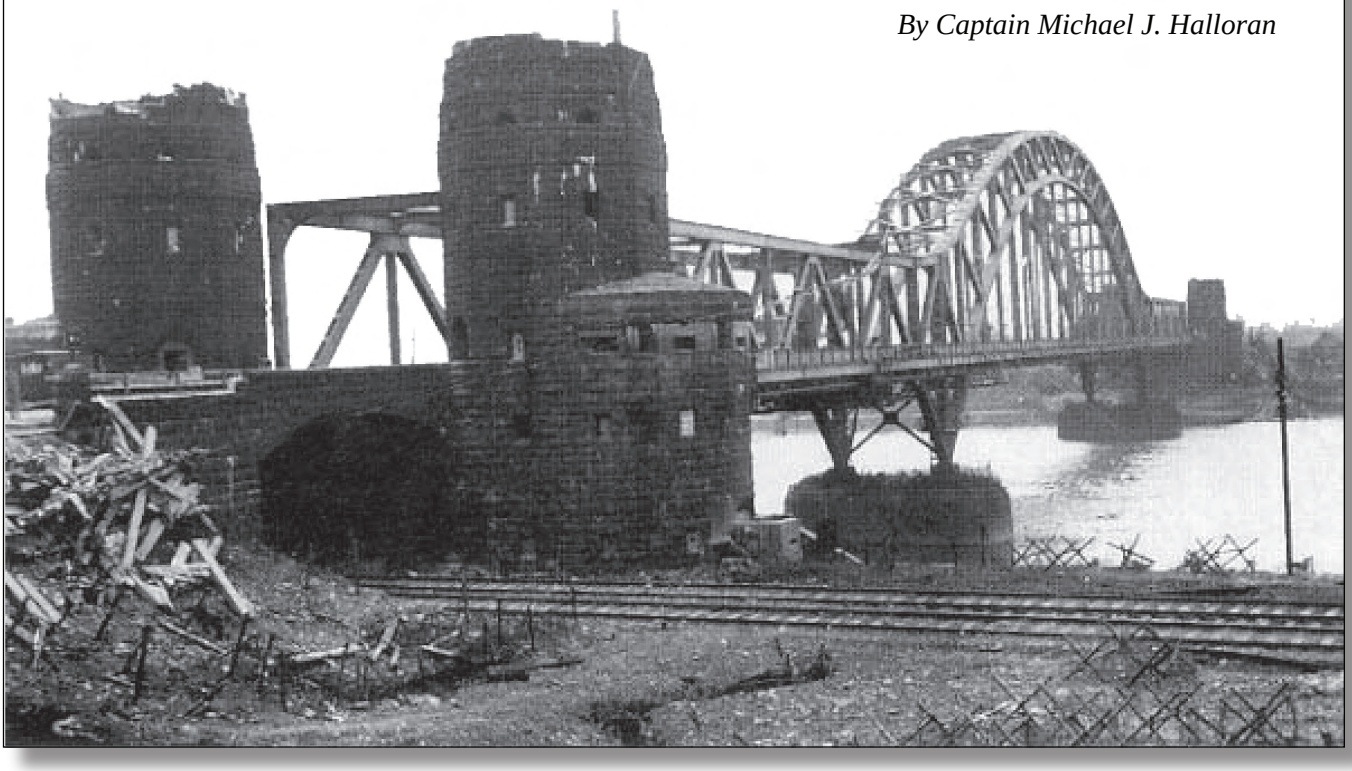
The Bridge at Remagen

By Captain Michael J. Halloran



"We were across the Rhine, on a permanent bridge; the traditional defensive barrier to the heart of Germany was pierced. The final defeat of the enemy, which we had long calculated would be accomplished in the spring and summer campaign of 1945, was suddenly, now, just around the corner."

—General Dwight D. Eisenhower

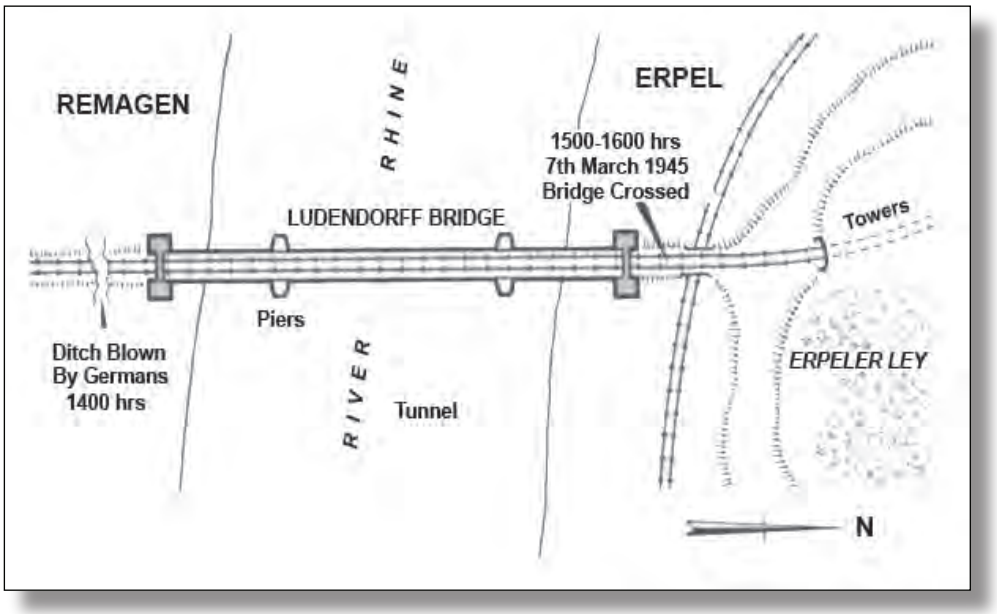
After successfully breaking through the defenses at the border of Germany early in 1945, the Allied forces had one obstacle—the Rhine River—denying them access to the heart of Nazi territory. At each Allied advance, the Germans destroyed the bridges spanning the river. The Ludendorff Bridge in Remagen was often overlooked due to its location 40 miles from the front lines. Thus, it was one of the few bridges still standing on 7 March 1945.

Remagen is located between Cologne and Koblenz. The Ludendorff Bridge stretched from the city of Remagen on the western bank to a 600-foot hill, known as the *Erpeler Ley*, on the eastern bank. The first American force to arrive at the bridge was a task force from the 9th Armored Division, commanded by Major General John W. Leonard. The task force consisted of the 14th Tank Battalion (minus Delta Company), the 27th Armored Infantry Battalion, and one platoon of C Troop, 85th Cavalry Reconnaissance Battalion.[1] Major Hans Scheller commanded the German forces defending Remagen and the Ludendorff Bridge. These forces included a bridge security company of 36 men led by Captain Willi Bratge, an engineer company of about 120 men led by Captain Karl Friesenhahn, 180 *Hitlerjugend*, an antiaircraft unit of 200 men, 20 men from a *Luftwaffe* rocket battery, 120 Eastern "volunteers," and roughly 500 civilian *Volksturm*. In all, the German forces amounted to roughly 1,000 men.[2]

Key Factors of the Battle

On 7 March 1945, Soldiers from the 9th Armored Division task force arrived at Remagen and captured the Ludendorff Bridge. The American forces won the battle by massing the effects of fire, rapidly conducting the operation, and taking the initiative. While the Germans did mass the effects of their flak guns and other available assets on the American tanks, they did not have enough firepower to overcome the American forces. Since the Germans did not integrate the effects of their fires with well-planned defensive positions, the Americans were able to reach the western banks of the Rhine River. This enabled the Americans to mass their own fires against the German units on the eastern bank. The Germans, fearing retaliation from superiors for failure to

follow orders, took no initiative to improve their situation. However, had they emplaced explosives in different locations, the bridge may have collapsed. The American forces took the initiative from the start of the operation because intelligence had suggested that the bridge would be collapsed by the time they arrived at Remagen. The capture of the Ludendorff Bridge led to the passage of thousands of Allied forces into the center of Germany and aided in the ultimate defeat of Nazi Germany.



The daylong fight for the Ludendorff Bridge across the Rhine was intense. The bridge was weakened during the fighting and eventually collapsed. By then, a firm American bridgehead had already been established.

Minimal German Resistance

The first key factor in this battle—the minimal German resistance in Remagen—allowed a fast push by the American forces to the Ludendorff Bridge. The German failure was caused primarily by the lack of rear-allocated forces and reliance on the *Volksturm*. The Germans allocated most of their forces to the front lines, thinking that the Allied forces would never reach the Rhine River, 40 miles behind the German defensive positions. This left minimal troops to reinforce their rear.

The bridge commander in Remagen, Captain Willi Bratge, had to rely on the *Volksturm* for the bulk of his forces. All over Germany, *Volksturm* troops were conscripted and committed close to their homes in the hope that they would fight to defend their homes and localities. These forces discovered that every time they showed resistance, the American forces methodically demolished every structure that could house defenders. It did not take long to discover that a quick surrender spared their lives, homes, and property.[3]

The German soldiers in the bridge security company were attached from a convalescent unit, where they were recovering from wounds. Most of them were still wearing bandages. During one of several air raids on the city of Remagen, the ferries used to transport workers and civilians from one side of the Rhine to the other were destroyed. In addition, German policy refused to allow planning for rear area defense in depth. All of the above, each of which had a profound effect on the outcome of the battle, help explain the minimal resistance provided by the German forces.

When the American Soldiers of the 9th Armored Division arrived at Remagen, they came upon almost no hindrance between the city's entrance and the Ludendorff Bridge. Due to the low morale of the *Volksturm*, the obstacles they had built were too weak to block tanks, the roadblocks they had emplaced allowed ample room for vehicles to pass, and some obstacles had been emplaced in open terrain.[4] Because most of Captain Bratge's forces consisted of the *Volksturm*, he had counted on them to provide the greatest defense in the city. However, the *Volksturm* had deserted and most of the main German force was located at the eastern side of the bridgehead. In addition, the members of the bridge security company were virtually useless in combat. Once troops from the convalescent unit became strong enough, they were sent back to rejoin combat units, and few replacements were sent.

The destruction of the ferries forced large amounts of civilian traffic across the Ludendorff Bridge. The German troops securing it had to check passes and keep people moving. This took away from the time the troops had to prepare defenses and demolitions. German policy allowed for few prepared defenses; little time to emplace; and no antitank ditches or mines, barbed wire, or trenches on the way to the Rhine. This allowed the 9th Armored Division to arrive at the bridge rapidly with few casualties, and German resistance at the bridge soon found it was not strong enough to withstand this unweakened American force.

Lessons Learned. Several lessons can be drawn from this key event. Due to Hitler's prohibition of defense in depth and the failure of the *Volksturm*, the German forces had no defensive plan in Remagen. By the time the Americans arrived there, the Germans had neither time to emplace an effective defense nor enough troops to defend the city. If obstacles or defensive positions had been emplaced, the Germans could have delayed the Americans' speed crossing the Ludendorff Bridge. The first company to cross the bridge consisted of dismounted infantry, and with machine guns mounted in the buildings, the Germans could have easily reduced these Soldiers. Tank ditches dug around the city and antitank mines emplaced along the routes to Remagen could have prevented Company A, 14th Tank Battalion—under the command

of First Lieutenant Karl Timmermann—from reaching the western banks of the Rhine. In turn, these tanks would have been delayed in decisively engaging the German flak guns on the eastern banks. Preparing a proper defense would have significantly diminished U.S. capabilities and assets available to attack the bridge. In addition, the delay could have given the German forces adequate time to mount a counterattack.

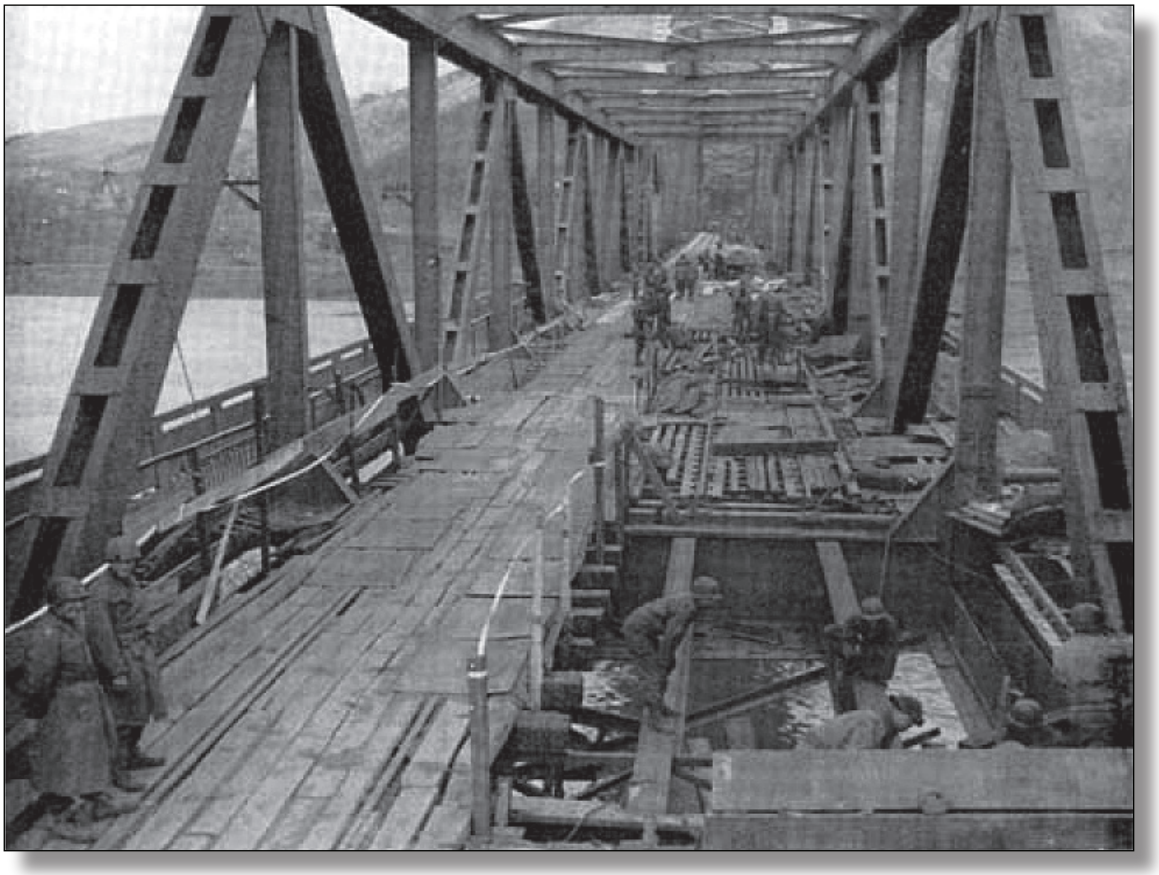
Doctrinal Guidance. The lessons learned from this key event are covered in United States Army doctrine. Field Manual (FM) 3-90, *Tactics*,[5] states that the defender does not wait passively to be attacked but aggressively seeks ways to weaken attacking forces before the initiation of close combat. The German forces at Remagen waited on the eastern banks of the Rhine River while the 9th Armored Division approached. They did nothing to weaken the American forces before they reached the bridgehead. FM 3-90 also states that a defense is more effective when there is adequate time to thoroughly plan and prepare defensive positions. Between the overcrowded traffic on the bridge and the official prohibition of defense in depth, the Germans forces at Remagen had no time to emplace a thorough defense.

Failed German Demolition Attempt

The failed attempt by the Germans to destroy the bridge with preemplaced explosives presents the second key factor in the successful U.S. operation. This failure was caused by many factors. During World War I, the French Army had occupied the Remagen area. While in charge of the Ludendorff Bridge, they discovered that each stone pier supporting the bridge contained two large demolition chambers that could be packed with explosives for easy destruction in case of an enemy attack. The French filled these chambers with cement.[6]

Weeks before the U.S. attack at Ludendorff Bridge, another German bridge had been inadvertently destroyed when an Allied bomb set off pre-positioned demolitions. Orders went out that all demolition material was to be removed and replaced on bridges only when an Allied army attack was imminent. Also, those responsible for losing a bridge to the enemy or for blowing up a bridge too soon faced a possible death sentence. Finally, Captain Friesenhahn ordered 600 kilograms of explosives, the amount determined necessary to destroy the bridge, but only received 300 kilograms. The type of explosives he received was an industrial explosive, which was less powerful than the regular military grade.[7]

The effects of these causes provide insight on how the bridge was taken. When the Germans began plans to demolish the bridge in case of attack, they discovered that the only way to remove the cement from the wells in the piers was to remove the main supports of the bridge, which could collapse the entire bridge.[8] Second, Hitler's order not to emplace explosives until an attack was imminent had a psychological effect on the engineers guarding the bridge. If any of the engineers armed the explosives too soon, they could suffer the death penalty. Third, the explosives on the Ludendorff Bridge were not detonated until the U.S. tanks were on the



U.S. Soldiers examine damages to the Ludendorff Bridge at Remagen, March 1945.

Present-day Remagen Bridgehead

western banks of the river, giving no time to adjust to the failed attempt. Last, due to the shortage of explosives and their low quality, the explosion inflicted minimal damage on the bridge. A main member of the bridge was damaged and a 30-foot hole was blown in the structure, but the bridge itself remained standing.

Lessons Learned. This key event presents a number of lessons. Although the engineers were not provided with the correct amount or type of explosives to blow the bridge, they failed to improvise with the supplies they had. If their limited amount of explosives had been placed in more effective positions to yield a larger explosion in one specific part of the bridge, they might still have collapsed the bridge or at least caused major damage. Instead, the Germans attempted to complete the previous plan with half the amount of explosives required. Furthermore, they failed to properly allocate supplies, insisting on sending large amounts to the front lines, which incapacitated the rear defenses. Once the German forces realized the Americans were encroaching on the Rhine River, they failed to respond in a timely manner or adapt to the changing situation by allocating supplies to the Rhine River bridges.

Doctrinal Guidance. The lessons learned from this event are also covered in U.S. doctrine. FM 3-34, *Engineer Operations*, states that responsiveness is "providing the right support in the right place at the right time."[9] It includes the ability to anticipate operational requirements and involves identifying, accumulating, and maintaining the minimum assets and capabilities to meet the support requirements. Flexibility is the capability to adapt logistical availability based on changing situations, missions, and concepts of the operation. Flexibility may also include improvisation, which is the ability to make, invent, or arrange what is needed from what is on hand. The Germans failed in all three aspects by neglecting to allocate necessary supplies at the right time. In turn, the engineers did not receive the right amount or type of explosives.

Communications Failures

The third key factor in the success of the American forces was caused by the limited communications in Remagen. The means of communication and transportation available to the German troops at Remagen were very meager. Until the beginning of March, neither Captain Bratge nor Captain Friesenhahn had a vehicle. The radio and telephone apparatus available to the Remagen commanders, although serviceable in normal times, was inadequate for an emergency. One telephone line connected the bridge to the regular German army line running between Bonn and Koblenz, and another line was connected by a civilian adapter to military district headquarters in Wiesbaden. Frequent bombings disrupted the lines for long periods, but even when undamaged, they were so busy it usually took a full day to complete a telephone call. For contact with the attached units in Remagen, Captain Bratge had to depend on the civilian telephone system, which was fairly reliable in normal times. However, electricity was needed to operate the line and could not always be obtained during combat. Also, the line had a tendency to go dead

suddenly when jarred by explosions, and it remained dead for weeks after a large bombing attack.[10]

The limited means of communication had multiple effects. When First Lieutenant Timmerman's few men on the east bank were most vulnerable, Major Scheller, the German commander, left the battle to find reinforcements, leaving Captain Bratge to conduct a counterattack. The ineffective communication systems at Remagen made it nearly impossible to contact any units outside of the defenders' immediate area. Without adequate transportation, the fastest means of contact was by bicycle. Major Scheller did not arrive at the 67th Corps Headquarters until 10 March. The possibility of German forces conducting an effective counterattack on the 9th Armored Division was nonexistent.

Lessons Learned. The main lesson offered in this event is the importance of communication on the outcome of a battle. The inability of the German forces to contact higher headquarters or any of the surrounding units made it impossible to conduct an effective counterattack. The minimal forces on the eastern banks were not strong enough to defeat the U.S. attackers. When the Soldiers of Company A, 27th Armored Infantry Battalion, arrived on the eastern banks of the river, they had been beaten down by constant fire from the German flak guns and snipers, and the unit was at its weakest point. If the German higher headquarters had prioritized communications and transportation assets at Remagen, Major Scheller would have been able to reach them and surrounding German units with enough time to prepare for a counterattack. Destroying Company A would have prevented the American forces from gaining a foothold on the eastern banks and taking the heights of *Erpeler Ley*. With American forces stuck on the western side of the river, the Germans would have had time for reinforcements to arrive.

Doctrinal Guidance. U.S. doctrine portrays the importance of an effective counterattack. FM 3-90,[11] states that the commander directs a counterattack to defeat or destroy enemy forces, exploit an enemy weakness, or to regain control of terrain and facilities after an enemy success. The commander plans and conducts a counterattack to attack the enemy when and where he is most vulnerable, while he is attempting to overcome friendly defensive positions. In every way, the situation was right for the Germans to conduct a successful counterattack on Company A. If the Germans' communications had been more effective—so they could have contacted another unit to reinforce them—they probably would have destroyed the American forces on the eastern banks and gained the time to receive the necessary reinforcements.

Summary

American forces captured the Ludendorff Bridge by an effective use of massing the effects of fire, rapidly conducting the operation, and taking the initiative. The German forces at Remagen relied heavily on the *Volksturm*, an untrained civilian force, leaving an ineffective defense within the city and limited firepower arrayed against the 9th Armored Division units. The highly trained American forces, upon reaching the banks of the Rhine River, integrated the fires of their tank companies in multiple positions and engaged the German forces on the east banks with massed firepower. This allowed Company A, 27th Armored Infantry Battalion, to successfully cross the bridge and secure the bridgehead. The German forces were often slow to adapt to changes and often failed to effectively react. From their positions atop *Erpeler Ley*, the Germans could see the approach of the American forces, allowing ample time to blow the bridge or even retest the explosives. Seeing the size of the American force and knowing their composition, the Germans knew they were outnumbered and should have attempted communication with nearby units much sooner. The American forces moved rapidly from the start of the operation, adapting to change with little or no pause. When the 9th Armored Division Soldiers were given the mission to cross the Rhine River, they did not know that the Ludendorff Bridge was still standing. The American forces adapted to the situation and took the initiative to conduct a bridge-crossing operation within hours of discovering the still-standing bridge.

Captain Halloran is the operations and training officer of the 169th Engineer Battalion, Fort Leonard Wood, Missouri. Previous assignments include platoon leader with Bravo Company, 9th Engineer Battalion, in Schweinfurt, Germany, with which he deployed to East Baghdad as part of Task Force 1-26 Infantry. He holds a bachelor's in biology from John Carroll University in University Heights, Ohio, and is a graduate of the Engineer Officer Basic Course, the Safety Officer Course, the Unit Movement Officer Course, the Explosive Ordnance Clearance Agent Course, and the Engineer Captains Career Course.

Endnotes

[1] M. Oyloe, C. Donnell, R. Gilmore, W. Hagan, R. Hardie, "Remagen Bridgehead, Offensive, Hasty Assault, River Crossing," United States Army Combat Studies Institute Battlebook 16A, Army Command and General Staff College, Fort Leavenworth, Kansas, 1996.

[2] Hechler, Ken, *The Bridge at Remagen*, Pictorial Histories Publishing Company, Incorporated, Missoula, Montana, 2001.

[3] Ibid., p. 40.

[4] Ibid., p. 41.

[5] FM 3-90, *Tactics*, 4 July 2001.

[6] Hechler, p. 58.

[7] Oyloe, Donnell, Gilmore, Hagan, Hardie, p. 45.

[8] Hechler, p. 58.

[9] FM 3-34, *Engineer Operations*, 2 January 2004.

[10] Hechler, p. 43.

[11] FM 3-90, *Tactics*, 4 July 2001.

Studies Define Solid Waste Stream at Base Camps

By Mr. Gary Gerdes

Base camp planning typically does not include a strategy for long-term management of nonhazardous solid waste, because this issue has low priority compared to other operational concerns. However, for camps that endure and evolve toward semipermanent status, solid waste quickly becomes a very large problem. Ideally, longer-term plans would put equipment and services in place when needed to handle the waste produced.

Solid Waste Studies

Before planners can identify ways to manage solid waste at base camps, they need to know the types and amounts of waste to be expected. Two studies completed by the United States Army Engineer Research and Development Center (ERDC) characterize, for the first time, the makeup of solid waste generated at military base camps. The findings are published in two ERDC technical reports and summarized in a public works technical bulletin (PWTB) issued by the United States Army Corps of Engineers.[1]

ERDC's Construction Engineering Research Laboratory (CERL) conducted the studies at two base camps in the Balkans. The sites included Camp A, which in 2003 had recently transitioned from contingency operations (CONOPS), and Camp B, which in 2006 had matured to semipermanent infrastructure capable of sustaining long-term missions. The research covered only nonhazardous solid waste such as plastic, light metal, paper and cardboard, scrap wood, sewage sludge, ashes, and miscellaneous trash.

Solid Waste Types

Results showed that the types of solid waste produced at the two camps were roughly similar. However, the amounts of specific waste types differed greatly. For example, much more plastic trash was found at the transitioning CONOPS site, Camp A, than at the more established Camp B. This was probably due to gradual replacement of single-serving bottled water with central distribution points for purified water at the older camp. The table on page 71 summarizes the waste produced at each camp. (Sites are not identified for operational security reasons.)

Plastic. The number of plastic bottles significantly decreased from 2003 at Camp A to 2006 at Camp B. This is likely due to efforts in the Balkan camps to provide bulk drinking water supplies to replace bottled water. However, the generation of "other plastic" significantly increased, possibly due to increased post exchange (PX) services on the base camps, which created an increase in disposal of plastic packaging.

Photograph courtesy U.S. Army Engineer Research and Development Center

To characterize the waste stream at both base camps, garbage was first sorted by category.

Light Metal. The light metal increased in 2006 at Camp B, perhaps because of an increase in the disposal of metal cans by the dining facility, where fewer meals, ready-to-eat, were issued, and more canned drinks became available at the PX.

Paper and Cardboard. The amount of paper and cardboard generated per person almost tripled from the 2003 Camp A sorting to the 2006 Camp B sorting. The greatest increases were in paper. This may be due in part to a fully stocked PX and

Results of Characterization Studies				
	2006 Data (Camp B)		2003 Data (Camp A)	
Component	lb/person/yr	Percent	lb/person/yr	Percent
Plastic bottles	196	3.0	295	5.1
Other plastic	502	7.6	143	2.5
Aluminum	46	0.7	10	0.2
Light metal	202	3.0	11	0.2
Cardboard (and paper)	529	8.0	349	6.1
Other paper	974	14.7	179	3.1
Food and vegetation waste	609	9.2	418	7.3
Textiles	95	1.4	25	0.4
Glass	37	0.6	40	0.7
Rubber	4	0.1	4	0.1
Polystyrene	21	0.3	9	0.2
Scrap wood	1076	16.2	4151	72.1
Sewage sludge	688	10.4	70	1.2
Ashes	811	12.2		0.0
Miscellaneous	838	12.6	52	0.9
Total	6627	100.0	5756	100.0

disposal of packaging. A high moisture content undoubtedly contributed to the high generation rate as well.

Scrap Wood. The amount of scrap wood showed a decrease of 75 percent in 2006 at Camp B compared to 2003 at Camp A, which might be attributed to two factors: Camp A in 2003 may have had more construction activities that created a large amount of construction debris; and it may have been more dependent on goods shipped from the United States, as opposed to the local economy, where goods were not palletized and arrived in smaller trucks.

Sewage Sludge. The huge increase in sludge generation cannot be explained. The sewage sludge reported in the 2003 Camp A survey was reported as dried solids. The moisture content of the sludge reported in the 2006 Camp B survey was not known, but was probably somewhat dry according to pictures in the report. It is possible that at the 2006 survey site, sewage sludge was collected from other base camps for disposal at the composting facility, thus raising the apparent generation rate.

Ashes. The results of the 2003 Camp A survey were based on the waste before incineration, because all wastes at Camp A were incinerated. The camp where the 2006 Camp B survey was done used an incinerator to dispose of items for security reasons, such as uniforms and documents. Since these items were always incinerated to ash, the ash was considered to be a component of generated waste. The materials that were incinerated were not included in other component fractions.

Miscellaneous. This category was significantly higher in the 2006 Camp B survey. Descriptions of the waste being sorted indicated that it was much wetter in 2006 than in 2003 at Camp A, making it more difficult to sort. It is also possible that the workers in 2003 were much more diligent at pulling apart compressed waste.

Conclusion

By understanding the types of solid waste produced under different circumstances, military base camp planners will be better able to develop strategies for its disposal. This information will enable proactive efforts to procure equipment and services to handle the waste in a timely fashion and ensure sustainable base camp operations.

Mr. Gerdes is a researcher at ERDC–CERL. During his 35 years at CERL, he has conducted studies in the areas of solid waste processing and management; oil-water separator design and management; and tactical vehicle washing. He holds a bachelor's from the University of Illinois and a master's from the University of Missouri. He can be reached at (217) 373-5831 or <gary.l.gerdes@usace.army.mil>.

Endnote

[1] Public Works Technical Bulletin 200-1-51, "Solid Waste Generation Rates at Army Base Camps," 1 April 2008, *<http://www.wbdg.org/ccb/ARMYCOE/PWTB/pwtb_200_1_51.pdf>*.

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Getting the Right Answers

By First Lieutenant Kelly Lanternier

In the current operating environment in Iraq, it is more important than ever to have all of the right answers. But what do you do if you are an engineer officer who is uncertain of the correct answer in a particular situation? The solution is easy—use the engineer "reachback" capability. The reachback capability is nothing new. The United States Army Engineer Research and Development Center (ERDC) has been using it for years, but unfortunately, awareness of this great resource is either unknown or unused by most engineers. Just recently, the 561st Engineer Company "Warriors" in Iraq learned just how valuable that resource is.

Photo by Specialist Josiah E. Johnson

With a clear view of the bridge in the background, the MANSCEN engineers can see the problem and receive valuable feedback from the engineers on the ground.

The reachback capability provides engineers in remote locations access to unique subject matter experts. This system connects the engineers with questions to the engineers with answers. ERDC employs highly educated, well-qualified professionals with diverse engineering degrees to help tackle any problem, and they are available to Soldiers on the ground 24 hours a day.

Engineers from the 561st were assigned the mission of constructing an unimproved road to provide freedom of maneuver to an armor task force near the Iranian border. Along the route was an unclassified bridge with no known load classification capacity. Field manuals only account for maximum load capacities (MLC) up to certain limits and knowing the exact MLC of the bridge became extremely important to the maneuver units on the ground, which have various pieces of heavy equipment of many different weights.

The professionals at the United States Army Maneuver Support Center (MANSCEN), at Fort Leonard Wood, Missouri, were quick to jump aboard to help when the 561st contacted them via e-mail. The 561st engineers provided MANSCEN with all of the known dimensions and data. In addition, the 561st engineers were able to communicate on-site using a device called the TeleEngineering Toolkit, enabling the engineers at MANSCEN to "see" the problem.

Essentially, the TeleEngineering Toolkit is a video teleconferencing unit hooked up to a laptop computer and a mobile phone. With a precoordinated linkup time, the system lets both parties communicate in real time. After compiling all the necessary information, a team of stateside bridge engineers was busy writing down formulas and going over equations, ultimately concluding that the bridge was not safe for tracked vehicles weighing more than 82 tons.

Engineer reachback is not limited to bridge classification. It can be used in almost any situation where engineers have limited resources to solve complex problems. The subject matter experts at MANSCEN are equipped with engineering expertise ranging from the history of a specific watershed to building designs to soil stabilization methods. One of the most important lessons learned by the deployed Soldiers of the 561st Engineer Company—do not hesitate to refer problems to the qualified engineers at MANSCEN.

First Lieutenant Lanternier is the executive officer of the 561st Engineer Company (Horizontal), 84th Engineer Battalion, deployed to Iraq for Operation Iraqi Freedom. Previously she was a platoon leader with the 643d Engineer Company (Vertical), 84th Engineer Battalion, Schofield Barracks, Hawaii; and platoon leader for the 561st Engineer Company. She holds a bachelor's in civil engineering from the United States Military Academy. In 2007, she passed the fundamental engineering exam and is now an engineer in training.

Waste-to-Energy Systems

By Mrs. Rebecca C. Wingfield

One of our newest resources is common, everyday trash. "Basic" science tells us that all objects have energy, whether they are trash, scraps, or treasure. Therefore, with the energy situation we are in, many have begun—or already had been—looking at our newest resource for energy. After all, a British thermal unit (BTU) of trash is the same as a BTU of petroleum. This idea has the potential to make companies a lot of money if they can solve some of the problems associated with turning waste (trash) into clean energy.

Clean energy is the crux of the problem. In former times when it was common, open burning of trash was smelly, dirty, and not very efficient. The Environmental Protection Agency (EPA) was created in 1970 with a mandate to clean up and protect the environment, so open trash burning in dumps in the United States became a thing of the past.

". . . [President Nixon] and Congress worked together to establish the…EPA…in response to the growing public demand for cleaner water, air, and land. Prior to the establishment of the EPA, the federal government was not structured to make a coordinated attack on the pollutants that harm human health and degrade the environment. The EPA was assigned the daunting task of repairing the damage already done to the natural environment and to establish new criteria to guide Americans in making a cleaner environment a reality."[1]

The next phase was to burn trash in special incinerators to produce heat energy, which was done on several college campuses and some military installations. Many of these incinerators shut down in the 1980s due to tougher air pollution regulations. Now, we are considering using municipal solid waste (MSW) (trash) to produce energy (electricity) for cities and elsewhere.

Systems Under Development

Technology is advancing, and several types of systems for producing energy are being tested:

Tactical Garbage to Energy Refinery

Last summer in Iraq, a system was tested called "Tactical Garbage to Energy Refinery" or TGER (pronounced "Teeger").

"TGER is small enough to fit into a CONEX [military shipping] container, but . . . [powers] a standard 60-kilowatt generator. TGER works by turning the solid [mixed waste] trash into fuel pellets which are fed into a down-draft gasifier. The gasifier [another word for a pyrolysis system] then heats the pellets, and breaks them down into a synthetic gas [syngas] composed of simple hydrocarbons that resembles low-grade propane. TGER processes the liquid and food waste into a hydrous ethanol, which is blended with the syngas to create usable energy. It takes TGER six hours to fully power up, during which time the amount of diesel fed into the machine slowly drops, until the generator is powered by less than one gallon of fuel per hour, as compared to five per hour without TGER."[2]

TGER's fuel is a mixed waste stream of sorted MSW of papers, plastics, and food-slop garbage. TGER, as it was tested, does not process glass, metals, or hazardous waste streams like medical wastes. This waste must still be processed some other way, but TGER is a step in the right direction.

Swearing in of the first Environmental Protection Agency administrator in 1970.

Biotechnologies

The Army has seen the opportunity to use biotechnologies to solve real problems to provide energy to power generators, and so forth, which provide about half of all the energy used at most forward operating bases (FOBs).[3] A new biorefinery from the United States Army Research, Development and Engineering Command (RDECOM) could cut down on the need for some of the fuel convoys during deployments. *"The two 4-ton machines were designed to fit into standard ISO [International Organization for Standardization] containers, bringing the technology down to a size that is easily transportable."*[4] According to RDECOM, the technology itself is not new:

"What's new about it is the way we put together two different technologies to have a hybrid. First, all the garbage is fed into a chute . . . ground . . . pelletized and gasified. . . Advanced fermentation is used for the food slop and field rations, which get converted into hydrous ethanol. We take those two streams and we blend them, and it gets aspirated into a standard Army generator set . . . a TGER unit can handle about a ton of garbage a day," creating a potentially significant alternative fuel source for the military. *"So if we can keep some of the convoys off the roads . . . drastically cut down on fuel use, it's a good thing all around. The only other byproducts from the TGERs are ash . . . a benign soil additive, and water . . . Once the TGER is ready for prime time, there's likely to be plenty of need for the units, and not just in the Army. The potential for their use at something like a post-Katrina event is huge, because there was plenty of garbage, plenty of trash, but no power.* [Other uses for them could be] *. . . at campsites, at hospitals, at schools,"* or wherever there are people creating masses of trash.[5]

Pyrolytic Gasification

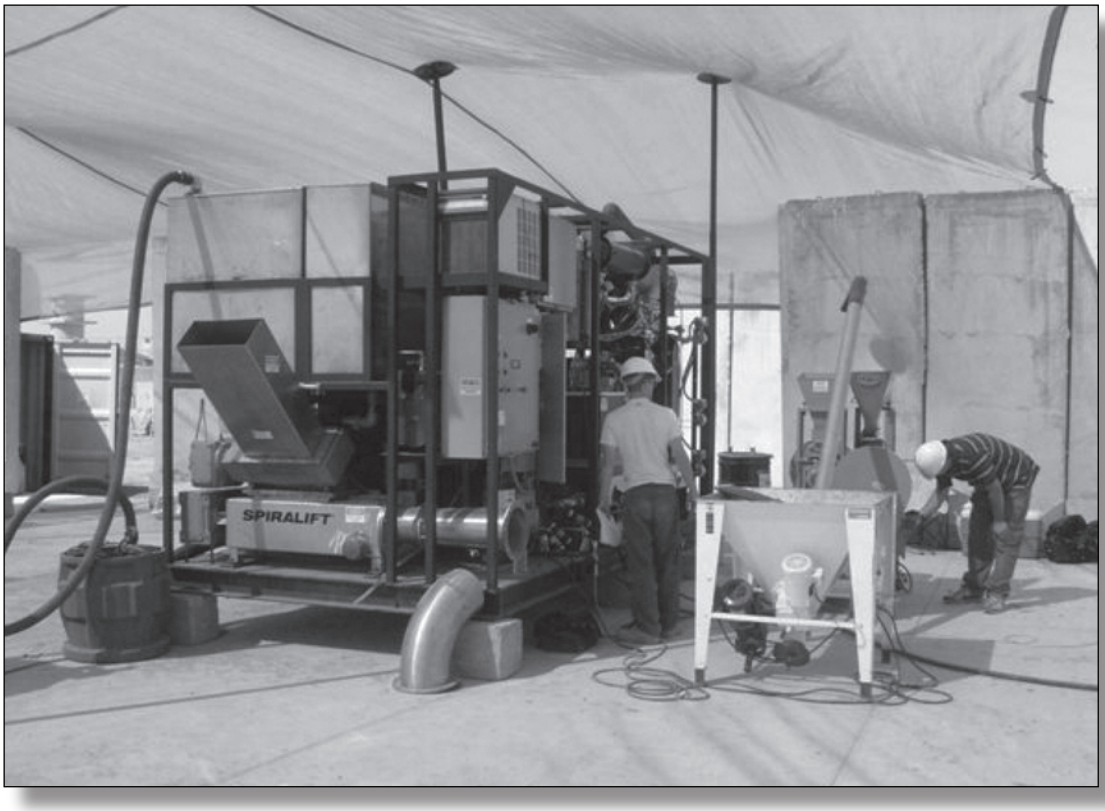
Pyrolytic gasification is not a new term. *"The principles were first brought forth in 1958 at Bell Laboratories within the United States. . . . Thereafter, a number of universities and organizations around the world started R&D [research and development] programs. The word pyrolysis, meaning chemical change brought about by heat, is widely used— even by incineration technologies, which have tried to escape their roots in oxidation and combustion because of the problems prevalent with both. Gasification is . . . the chemical reaction and molecular breakdown or degradation of materials.*

The first pyrolytic gasification systems were brick ovens that used indirect heat/low oxygen.... Waste was placed into the unit, the unit was sealed, and heat applied. After the process of degradation was completed, the oven was opened and emptied to make room for the next batch. Therefore, these systems were known as batch-by-batch systems. This format was first introduced commercially in the early 1970s."[6]

Across the pond, the Royal Navy is using technology to produce energy from waste with pyrolysis technology from QinetiQ.® *"As landfill sites become increasingly overloaded and refuse disposal an escalating problem, engineers have perfected a technology that not only breaks down waste to just a fifth of its previous volume, but generates energy at the same time."*[7]

In this technique of burning waste without oxygen, *". . .pyrolysis as a method of waste disposal provides a host of potential benefits. Unprocessed waste can be treated in a burner to reduce its mass by 80 percent. The end product is an inert ash, which itself is useful and can be bonded to form the lightweight blocks used for building internal walls. Additionally, pyrolysis has the potential to generate 'green'*

***HMS Ocean* received a pyrolysis unit in 2008.**



Contractors install the Tactical Garbage to Energy Refinery (TGER) in Iraq.

energy as a byproduct. Pyrolysis yields an 80 percent heat output: if you put 100 kilowatts of energy into the process, it produces 80 kilowatts of heat energy. This heat can be used to power a steam turbine to generate electricity."[8]

Although this process affords the benefits of cutting down numbers of personnel and saving valuable space, *"the pyrolysis system has not been without considerable engineering challenges, however. The system is shaped like a tube, into which the waste is inserted at one end. A screwlike device then pushes waste along the tube at enormous pressure. As the waste passes through, it is heated—without oxygen—to between 800 and 1,100 degrees celsius (C). By the time it reaches the end of the tube, it has been reduced to a grey ash, which can be emptied out. The heat energy by-product of the process is fed back into the system and is used to drive the device so that, once started, it effectively becomes a self-driving process. The ship-based burners are designed to handle 2.8 tons of waste per day—roughly the amount of waste produced by the ship's complement."*[9]

Modular and Containerized Technologies

Several research and development systems have been developed that integrate technologies into modular and containerized systems. These systems usually consist of a solid waste management system, a water purification system, a power generation system, and/or living units. One of the requirements of a modern military force is that it be modular and scalable, which this system is. Approximately 20 ISO containers can carry one system that provides virtual self-sufficiency for a community of 500 people in drinking water and waste management. The plant, which is capable of dealing with about 2 tons of mixed solid waste per day, will destroy wood, paper card, food, plastics, and sanitary, clinical, and oil waste and satisfies the emission requirements of the European Union. This system is supplemented by harvesting water from the air and from the diesel generator exhaust gas stream. When burned, diesel fuel generates a useful amount of water vapor. The exhaust gas stream from the diesel generator is processed to remove the entire water content, which is then sent to the liquid waste plant for purification. As newer technology becomes available, other containers could easily be integrated into the system.

Waste Streams

"A wide variety of waste streams can be used for power production . . . The moisture content in sewage sludge and other toxic liquids or waste materials having high oxygen content will be dehydrated prior to system introduction. A material recovery facility—sometimes referred to as a municipal recycling facility (MRF)—for front-end material handling will be waste-stream specific in design. Liquids will be conveyed by a cavitation pump, whereas solids are generally transported by a conveyor system.

Transportable electrical power that is generated by the process is in the region of 3.8 kilowatt-hours per 7000± BTUs, which is the average value per pound produced by MSW—one of the lowest in calorific value. Higher BTU values of 14,000+ per pound in materials such as rubber or plastics will produce 8+ megawatt-hours. Incineration systems are typically 50 percent efficient, but with [most pyrolysis systems], 75 to 90 percent of the BTU value (depending on the waste stream) is available as an energy source."[10]

Summary

Waste-to-energy is a way to use MSW and other waste streams to produce electricity for use in cities and elsewhere. For the military to use this technology, it must be scalable and modular. Current research in systems such as TGER, biotechnologies, pyrolytic gasification, and modular and containerized technologies is yielding more economical and environmentally protective solutions for clean energy. Waste-to-energy systems are the

wave of the future for many reasons, but mostly because they are the smart and right thing to do.

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The Essayons Button

By Dr. Larry D. Roberts

As with many aspects of military history, the origins and originators of military customs, emblems, and insignia are lost to the mist of the past. This is certainly the case with the distinctive button worn by engineer officers—the Essayons Button. Evidence does suggest that it is the oldest uniform element or emblem unique to the Corps of Engineers.

The history of the Essayons Button can be traced to the earliest days of the Corps of Engineers. As early as the American Revolution, there was an effort to distinguish the uniforms of the engineers from those of the rest of the Army. However, during the Revolution, officers wore buttons either identifying them with their states, if they were militia, or with "USA," if they were with the regular Continental Army.

In 1794, Congress authorized a regiment of artillerists and engineers that took station at West Point, New York. In time, the officers of this regiment wore a button with an eagle standing on a field piece. Later, the eagle disappeared and the inscription USA&E, for U.S. artillerists and engineers, was placed on the button. In 1802, the artillery and engineers were separated, forming their own independent corps. Once again, efforts were initiated to create something that could distinguish engineer officers from those of other branches or arms.

Sometime between 1802 and 1814, the design for the Essayons Button was developed. At that time, the Corps's primary mission was the construction of coastal fortifications. The first Commandant of the United States Military Academy, and Chief Engineer, Major Jonathan Williams, was given the freedom to develop uniform items for the Corps and the cadets at West Point. A map of the coastal fortifications at Charleston, South Carolina, drawn in 1806, shows an eagle with a scroll in its beak with the word "Essayons"—the first time that this French word, meaning "we will try," is found on a formal document produced by the Corps. A map made of the defenses of New York Harbor the following year also had an eagle and the word "Essayons." In addition, it had a water bastion, and rays depicting the rising sun. Therefore, by 1807, all of the elements of the Essayons Button had been adopted and used by officers of the Corps.

The earliest reference to the Essayons Button is found in an account written by General George D. Ramsey. Recalling his days as a cadet in 1814, he noted that "… Captain Partridge was never known to be without uniform… His was that of the Corps of Engineers, with the embroidered collar and cuffs and the Essayons Button…."[1] Clearly, Major Williams and other officers of the Corps had arrived at a design for a button to distinguish the uniform of the engineer officer. Influenced by the historic ties with French engineers, the leadership of the Corps of Engineers had not only adopted the French term "Essayons" but also had incorporated it into a button showing the principal mission of the engineers—fortification.

In 1840, the War Department officially endorsed the button for the Corps of Engineers. General Orders 7, Adjutant General's Office, dated 18 February 1840, described the button as "an eagle holding in his beak a scroll with the word 'Essayons,' a bastion with embrasures in the distance, surrounded by water, and rising sun…."[2] Of interest, the same general order also authorized the turreted castle for wear by engineer officers. Coincidentally, the Commanding General of the Army at that time was Alexander Macomb, a former engineer officer.

The Essayons Button was, therefore, uniquely associated with the Corps of Engineers. When the Army adopted a standard button for its uniforms in 1902, the Corps already had almost a century of identification with the Essayons Button. Consequently, the Corps of Engineers was the only branch authorized to retain a distinctive button on the uniforms of its officers.

Dr. Roberts is the Director of Historical Programs, United States Army Engineer School, Fort Leonard Wood, Missouri.

Endnotes

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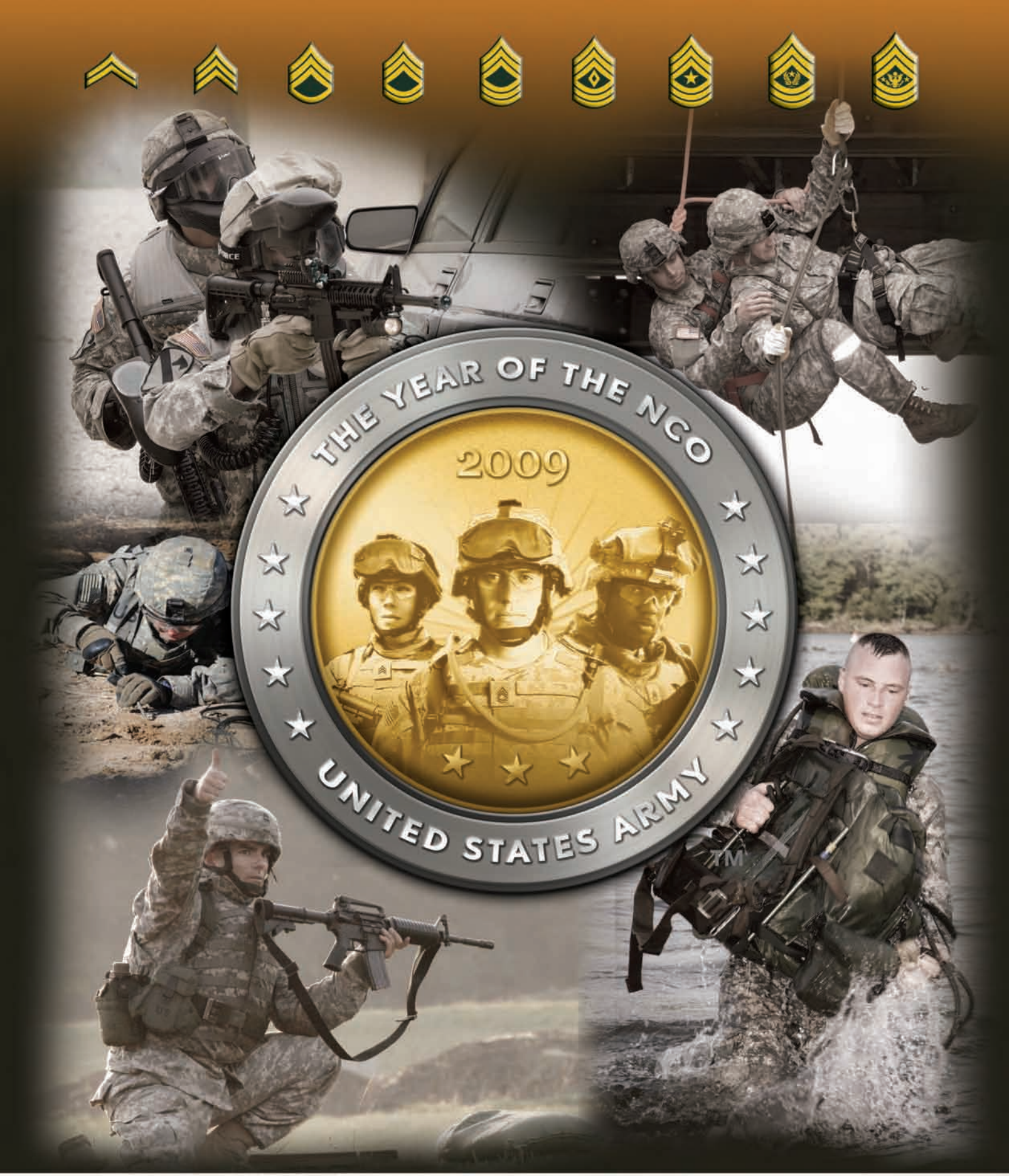

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